

**Labour mobility within the EU -
The impact of enlargement and the functioning
of the transitional arrangements**

FINAL REPORT

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Project Summary

Background

The main focus of this study is an assessment of the macro-economic impact on both host and home countries of the increased labour mobility that has resulted from the two recent EU enlargements. We first look at the macro-economic impact of the total population flows from the EU-8 and EU-2 to the EU-15 economies between 2004 and 2009. The aggregate population flows to the EU-15 are adjusted to reflect the age structure and education level of the mobile population. We also consider the impact of remittances. We then attempt to quantify the share of population movements that have occurred since 2004 and 2007 that can be attributed to the enlargement process itself, and the share that is likely to have occurred even in the absence of EU expansion. We finally look at the impact that transitional restrictions on the free mobility of labour have had on the distribution of EU-8 and EU-2 citizens across the EU-15 countries.

The results obtained from these analyses are then applied to the period from 2008-2009, to assess the impact of the global financial crisis on the distribution of population flows across the EU-15. The macro analysis section concludes with estimates of potential migration flows from the EU-8 and EU-2 to the EU-15 over the next several years. As a supplement to this analysis, we have undertaken six country case studies, to provide a more detailed overview of the scale and impact of population flows from the EU-2 to the EU-15 economies. We also produce a very preliminary assessment of potential migration flows from six candidate and pre-candidate countries: Croatia, FYR Macedonia, Albania, Bosnia and Herzegovina, Montenegro and Serbia

Key Findings

Our estimates to end-2009 suggest that:

- Since the 2004 enlargement, about **1.8 per cent of the EU-8 population has moved to the EU-15**, raising the host country population by 0.3 per cent. Of this, approximately 75 per cent can be attributed to the enlargement process itself.
- Since 2007, about **4.1 per cent of the EU-2 population has moved to the EU-15**, raising the host country population by a further 0.3 per cent. Of this, just over 50 per cent can be attributed to the enlargement process itself.
- The potential level of output in **Bulgaria, Romania and Lithuania** may be permanently reduced by 5-10 per cent as a result of the population shifts towards the EU-15 since 2004. **Latvia and Estonia** can also expect a permanent scar of at least 3 per cent on the potential level of output in their economies.

- While **remittances can partially offset the negative effects** on growth in sending countries in the short- to medium-term, they cannot fully address the loss of labour input on capacity output in the longer-term.
- The **impact on GDP per capita is much smaller** than the impact on total GDP, but also tends to be negative in the sending countries, especially given the age structure of migrants, who are predominantly of working age.
- As for the **receiving countries**, the macro-economic impact of the population shifts from the EU-8 and EU-2 to the EU-15 since 2004 is expected to be small, possibly raising the long-run level of potential output by about ½ per cent. The impact on **Ireland** is expected to be more significant, perhaps raising the potential level of GDP by 3 per cent in the long-run. The **UK** may also benefit from a rise in potential output of just over 1 per cent.
- The long-run **impact on GDP per capita is expected to be negligible in the EU-15**, but may be slightly positive, depending on the productive capacity of inward migrants. Outflows of **remittances** are expected to have only a marginal negative effect on host countries.
- There is clear evidence that the pattern of **transitional restrictions** in place at the beginning of the **2004 enlargement** diverted mobile workers away from traditional destinations – namely Germany – and towards the more easily accessed labour markets in the UK and Ireland.
- However, we should not over-emphasize the magnitude of this impact, as **macro-economic developments and demographics** have also played a role in the location decision, and in many cases appear to have played the dominant role.
- **Transitional restrictions** may have also played a certain role for the **EU-2** economies, although the rise in the unemployment rate in **Spain** can explain about half of the nearly 10 percentage point loss of EU-2 migrant stock share between 2006 and 2009.
- As of June 2011, workers from the **EU-2 still face some restrictions** on access to labour markets in Belgium, Germany, Ireland, France, Italy, Luxembourg, the Netherlands, Austria, the UK and Malta. The second phase of the transitional arrangements for the 2007 enlargement will come to an end on 31 December 2011, at which point the governments in these countries will have to decide whether or not to extend the restrictions for a further two years.
- Our findings suggest that, due to network effects, **transitional arrangements can have permanent effects** on the pattern of migration. This may be of particular importance in host countries where the working age share of the population is in decline. Countries that retain restrictions are expected to have a lower level of potential output in the long-run as a result. Allowing full labour market access has not been found to have significant adverse effects on the host economy.

Résumé du projet

Contexte

Le principal objectif de cette étude est d'évaluer l'impact macroéconomique de la mobilité accrue des travailleurs à la suite des deux derniers élargissements de l'Union européenne sur les pays d'accueil et d'origine. Nous nous concentrons d'abord sur l'impact macroéconomique du flux migratoire total venant des économies de l'UE-8 et de l'UE-2 vers les économies de l'UE-15 sur la période 2004-2009. L'ensemble des flux migratoires vers l'UE-15 sont ajustés afin de refléter l'âge et le niveau d'éducation de la population migrante. Nous analysons aussi l'impact des transferts de fonds. Nous essayons ensuite de quantifier la part des mouvements de population depuis 2004 et 2007 qui pourrait être attribuée au processus d'élargissement en soit, et la part qui se serait probablement produite même en l'absence de ces élargissements. Enfin, nous nous intéressons aux restrictions transitoires sur la libre circulation des travailleurs, et à leur impact sur la distribution des citoyens originaires de l'UE-8 et de l'UE-2 au sein de l'UE-15.

Les résultats obtenus à partir de ces analyses sont ensuite utilisés pour évaluer l'impact de la crise financière mondiale sur la distribution des flux migratoires au sein de l'UE-15 depuis 2008-2009. L'analyse macroéconomique aboutit à des estimations à moyen terme sur les éventuels flux migratoires à partir des économies de l'UE-8 et de l'UE-2 vers celles de l'UE-15. Nous avons ajouté six études de cas à cette analyse afin d'apporter une vue d'ensemble détaillée sur l'ampleur et l'impact des flux migratoires des pays de l'UE-2 vers l'UE-15. Nous avons aussi préparé une évaluation préliminaire des éventuels flux migratoires de six pays candidats et candidats potentiels : Croatie, Ancienne République Yougoslave de Macédoine, Bosnie-et-Herzégovine, Monténégro, et Serbie.

Conclusions principales

Nos estimations à fin 2009 suggèrent que:

- Depuis l'élargissement de 2004, environ **1.8 pour cent de la population des pays de l'UE-8 a migré vers l'UE-15**, soit une augmentation de 0.3 pour cent de la population des pays d'accueil. Environ 75 pour cent de ce flux peuvent être attribués au processus d'élargissement en soit.
- Depuis 2007, environ **4.1 pour cent de la population des pays de l'UE-2 a migré vers l'UE-15**, augmentant la population des pays d'accueil de 0.3 pour cent supplémentaire. Un peu plus de 50 pour cent de ce flux peut être attribué au processus d'élargissement en soit.
- La capacité de production en **Bulgarie, Roumanie et Lituanie** pourrait être définitivement réduite de 5-10 pour cent due aux mouvements de population

vers les pays de l'UE-15 depuis 2004. La **Lettonie** et l'**Estonie** peuvent aussi s'attendre à une perte permanente d'au moins 3 pour cent de leur production potentielle.

- Alors que **les transferts de fonds peuvent en partie compenser les effets négatifs** à moyen-court terme sur la croissance des pays d'origine, cela ne contrebalance pas complètement les effets de la perte de main-d'œuvre sur la capacité de production à long terme.
- **L'impact sur le PIB par habitant est bien moins important** que l'impact sur la croissance totale et a tendance à être négatif dans le pays d'origine étant donné que la population migrante est principalement une population en âge de travailler.
- Du côté des **pays d'accueil**, l'impact macroéconomique des mouvements de population des pays de l'UE-8 et de l'UE-2 vers les pays de l'UE-15 depuis 2004 devrait être léger; la capacité de production de long terme pourrait augmenter d'environ ½ pour cent. L'impact sur l'**Irlande** devrait être plus important avec une augmentation possible de sa capacité de production de long terme par 3 pour cents. Le **Royaume Uni** pourrait aussi bénéficier d'une augmentation de sa capacité de production d'environ 1 pour cent.
- A long terme, **l'impact sur le PIB par habitant dans les pays de l'UE-15 devrait être négligeable** mais positif, en fonction de la capacité productive des immigrants. La fuite de capitaux ne devrait avoir qu'un effet négatif marginal sur les pays d'accueils.
- Il apparaît clairement que les **restrictions transitoires** en place au début de **l'élargissement de 2004** ont détourné les travailleurs migrants de leurs destinations traditionnelles – à savoir l'Allemagne - vers d'autres pays tel que le Royaume Uni et l'Irlande dont le marché du travail était plus facile d'accès.
- Cependant, nous ne devons pas exagérer l'ampleur de cet impact puisque les **développements macroéconomiques et les caractéristiques démographiques** ont aussi influencé les choix de destination, souvent de manière significative.
- Les **restrictions transitoires** ont aussi joué un certain rôle sur les économies de l'UE-2, même si l'augmentation du taux de chômage en **Espagne** peut expliquer la moitié des 10 points de pourcentage perdus sur la part du stock de migrants provenant des pays de l'UE-2 entre 2006 et 2009.
- En juin 2011, les travailleurs des pays de **l'UE-2 font toujours face à certaines restrictions** d'accès aux marchés du travail en Belgique, Allemagne, Irlande, France, Italie, Luxembourg, Pays Bas, Autriche, Royaume Uni et à Malte. La deuxième étape des dispositions transitoires pour l'élargissement de 2007 prendra fin le 31 décembre 2011, date à laquelle les gouvernements de ces pays devront décider si ces restrictions doivent être maintenues pour deux ans supplémentaires ou non.

- Nos résultats semblent indiquer que des **dispositions transitoires peuvent avoir des effets permanents** sur les comportements migratoires dus aux effets de réseaux. Cela pourrait être d'autant plus important là où la part de la population en âge de travailler diminue. Les pays qui maintiennent des restrictions devraient en conséquence avoir un niveau de production potentielle plus bas dans le long terme. Il n'a pas encore été montré que de permettre un accès total au marché du travail pouvait avoir d'importants effets adverses sur l'économie du pays d'accueil.

Zusammenfassung des Projekts

Hintergrund

Das Hauptaugenmerk dieser Studie ist die Evaluierung der makroökonomischen Wirkung der aufgrund der zwei EU-Erweiterungsrunden gestiegenen Arbeitsmobilität auf Gast- und Heimatländer. Zunächst wird die makroökonomische Wirkung der gesamten Wanderungsströme aus der EU-8 und EU-2 in die ökonomien der EU-15 für den Zeitraum von 2004 bis 2009 betrachtet. Die aggregierten Bevölkerungsströme in die EU-15 wurden bereinigt, um die Altersstruktur und das Bildungsniveau der mobilen Bevölkerung widerzuspiegeln. Die Studie berücksichtigt auch die Effekte von Geldsendungen in die Ursprungsländer. Daraufhin wird versucht, den Anteil der sich ab 2004 und 2007 ereignenden Bevölkerungswanderungen, die dem Erweiterungsprozess selbst zugerechnet werden können, und den Anteil der sich wahrscheinlich auch ohne die EU-Erweiterung ergeben hätte, zu ermitteln. Abschließend wird in der Studie die Wirkung der vorübergehenden Beschränkungen der freien Arbeitskräftemobilität auf die räumliche Verteilung der EU-8 und EU-2 Staatsbürger zwischen den EU-15 Ländern betrachtet.

Die Ergebnisse dieser Analysen wurden dann angewendet, um die Wirkung der globalen Finanzkrise auf die räumliche Verteilung der Wanderungsströme in der EU-15 im Zeitraum 2008 bis 2009 zu ermitteln. Die Makroanalyse beschäftigt sich mit den Schätzungen des Migrationspotentials aus der EU-8 und EU-2 in die EU-15 für die nächsten Jahre. Als Ergänzung zu dieser Analyse wurden sechs Länderfallstudien vorgenommen, um eine detailliertere Übersicht über das Ausmaß und die Wirkung der der Wanderungsströme aus der EU-2 in die EU-15 zu liefern. Darüber hinaus wurde auch eine vorläufige Analyse von potentiellen Migrationsströmen aus den folgenden sechs Bewerberländern und potentiellen Kandidatenländern erstellt: Kroatien, ehemalige jugoslawische Republik Mazedonien, Albanien, Bosnien und Herzegowina, Montenegro und Serbien.

Zentrale Forschungsergebnisse

Die Schätzungen der Studie bis Ende 2009 deuten auf folgende Aussagen hin:

- Seit der Erweiterung in 2004 sind etwa **1,8 Prozent der Bevölkerung der EU-8 in die EU-15 gewandert**, was die Bevölkerung der Gastgeberländer um 0,3 Prozent erhöht hat. Davon können ungefähr 75 Prozent dem Erweiterungsprozess selbst zugerechnet werden.
- Seit 2007 sind etwa **4,1 Prozent der Bevölkerung der EU-2 in die EU-15 gewandert**, was die Bevölkerung der Gastgeberländer um weitere 0,3 Prozent erhöht hat. Davon können knapp über 50 Prozent dem Erweiterungsprozess selbst zugerechnet werden.

- Als Folge der Bevölkerungsverlagerung hin zur EU-15 dürfte der Wert der potentiellen Wirtschaftsleistung in **Bulgarien, Rumänien und Litauen** dauerhaft um 5 bis 10 Prozent reduziert worden sein. **Lettland** und **Estland** können ebenso eine permanente Minderung von mindestens 3 Prozent ihrer potentiellen Wirtschaftsleistung erwarten.
- Während **Geldsendungen aus den Aufnahmeländern die negativen Effekte aufs Wachstum in den Abgabeländern teilweise kurz- und mittelfristig ausgleichen** können, vermögen sie es jedoch nicht, den Verlust an Arbeitsinput in den Kapazitätsoutput auf lange Sicht zu adressieren.
- Der **Effekt aufs BIP pro Kopf ist wesentlich geringer** als der Effekt auf die Gesamtsumme des BIP, neigt aber dazu, in Abgabeländern negativ auszufallen, insbesondere angesichts der Altersstruktur der Migranten, die vorherrschend im arbeitsfähigen Alter sind.
- Für die **Aufnahmeländer** wird der makroökonomische Effekt der Bevölkerungsverlagerung von der EU-8 und EU-2 zur EU-15 als gering erwartet. Gegebenfalls wird die potentielle Wirtschaftsleistung langfristig um etwa 0,5 Prozent gesteigert. Es wird erwartet, dass die Wirkung in **Irland** höher ausfällt und die potentielle Wirtschaftsleistung möglicher Weise langfristig um 3 Prozent steigert. Auch das **Vereinigte Königreich** könnte von einer Erhöhung der potentiellen Wirtschaftsleistung von knapp über 1 Prozent profitieren.
- Es wird angenommen, dass der **langfristige Effekt aufs BIP pro Kopf in der EU-15 vernachlässigbar** oder aber gering positiv ist, abhängig von der Leistungsfähigkeit der Immigranten. Die Abflüsse von **Geldsendungen** lassen einen nur marginal negativen Effekt auf die Gastgeberländer vermuten.
- Es gibt klare Anzeichen darauf, dass die Struktur von **Übergangsregelungen** zu Beginn der **Erweiterungsrunde in 2004** mobile Arbeitnehmer von traditionellen Zielländern – nämlich Deutschland – in einfacher zugängliche Arbeitsmärkte im Vereinigten Königreich und Irland umgelenkt hat.
- Jedoch sollte die Größenordnung dieses Effekts nicht überschätzt werden, da **makroökonomische und demographische Entwicklungen** ebenso eine Rolle in der Standortentscheidung gespielt haben, die in vielen Fällen gar die dominanteren dominierende Rolle gehabt haben dürften.
- **Übergangsregelungen** dürften auch eine gewisse Rolle für die Ökonomien in der EU-2 gespielt haben, obwohl der Anstieg der Arbeitslosenquote in **Spanien** etwa die Hälfte des Verlusts von nahezu 10 Prozentpunkten am Anteil des EU-2-Migrantenbestands zwischen 2006 und 2009 erklären kann.
- Zum Juni 2011 sahen sich Arbeitnehmer aus der **EU-2 immer noch mit einigen Beschränkungen des Arbeitsmarktes** in Belgien, Deutschland, Irland, Frankreich, Italien, Luxemburg, den Niederlanden, Österreich, dem Vereinigten Königreich und Malta konfrontiert. Die zweite Phase der

Übergangsregelungen für die Erweiterungsrunde in 2007 wird am 31. Dezember 2011 zu Ende gehen. An diesem Punkt werden die Regierungen der oben genannten Länder entscheiden müssen, ob sie Beschränkungen für weitere zwei Jahre verlängern werden oder nicht.

- Die Ergebnisse der Studie legen nahe, dass **Übergangsregelungen** aufgrund der Bildung von Migrantennetzwerken **permanente Effekte** auf die Wanderungsmuster haben können. Das dürfte besonders in Aufnahmeländern, in denen der Anteil der Bevölkerung im arbeitsfähigen Alter sinkt, von Bedeutung sein. Länder, die Restriktionen aufrecht erhalten, dürften als Folge eine langfristige Minderung der potentiellen Wirtschaftsleistung erwarten. Die Erteilung der Erlaubnis des vollständigen Zugang zum Arbeitsmarkt birgt laut vorliegender Studie keine signifikant negativen Effekte für die Wirtschaft des Gastgeberlandes.

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1. Clarification of terms used throughout this report

Throughout this report, there are a number of terms and abbreviations that are used, to which we attach a precise meaning and interpretation. We clarify these terms below:

EU-15 is used to designate the 15 countries that form the EU before 2004: Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom.

EU-10 is used to designate the 10 countries that joined the EU in 2004 (Cyprus, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, Slovenia, Slovakia).

EU-8 is used to designate the EU-10, excluding Malta and Cyprus.

EU-2 is used to designate the 2 countries that joined the EU in 2007 (Romania and Bulgaria).

EU-8+2 is used to designate the EU-8 plus the EU-2, as defined above.

EU-10+2 is used to designate the EU-10 plus the EU-2, as defined above.

Unless otherwise specified, migrant stock figures refer to end-year levels. These correspond to the 1 January figures of the following year where sourced from the Eurostat Population statistics.

2. Executive Summary

Free movement of workers within the EU was achieved in 1968 and acts as one of the four pillars of the EU Single Market. While the policy was introduced with aim of removing barriers to the functioning of a fully integrated market economy in Europe and improving the matching of labour supply and demand, concerns regarding the sudden shock of opening labour markets in existing member countries have been an issue in all subsequent enlargements where a significant wage differential existed between new and old member states (1981, 1986, 2004 and 2007). While in the long-run, free mobility can be expected to raise potential growth in the EU as a whole, the shock to labour markets and wages may have negative impacts on host economies in the short-term. To counter-act these factors, member states have been allowed to temporarily restrict the free mobility of workers from acceding countries for a period of 5 years in general, and up to 7 years under certain circumstances. These transitional arrangements are intended to smooth the shock to labour markets of the enlargement process.

The main focus of this study is an assessment of the macro-economic impact on both host and home countries of the increased labour mobility that has resulted from the two recent EU enlargements. We first look at the macro-economic impact of the total population flows from the EU-8 and EU-2 to the EU-15 economies between 2004 and 2009. In both cases we restrain our analysis of the receiving countries to the impact on the EU-15 economies. Population flows from the EU-2 to the EU-10 economies have been small in magnitude, and data availability is sporadic, and for this reason these flows are excluded from the simulation studies. The aggregate population flows to the EU-15 are adjusted to reflect the age structure and education level of the mobile population. We also look at the impact of remittances. For the 2004 enlargement, we focus attention on the EU-8 economies, as citizens from Malta and Cyprus were not affected by transitional restrictions and, given their size, the impact of any emigration from these countries can be expected to have negligible impact on the host economies.

We then attempt to quantify the share of population movements that have occurred since 2004 and 2007 that can be attributed to the enlargement process itself, and the share that is likely to have occurred even in the absence of EU expansion. We next look at the impact that transitional restrictions on the free mobility of labour have had on the distribution of EU-8 and EU-2 citizens across the EU-15 countries. The results obtained from these analyses are then applied to the period from 2008-2009, to assess the impact of the global financial crisis on the distribution of population flows across the EU-15. The macro analysis section concludes with estimates of potential migration flows from the EU-8 and EU-2 to the EU-15 over the next several years, to 2017.

Our estimates suggest that since the 2004 enlargement, about 1.8 per cent of the **EU-8 population** has moved to the EU-15, raising the host country population by 0.4 per cent. Of this, approximately 75 per cent can be attributed to the enlargement process itself, while the remaining 25 per cent of the population shifts are likely to have occurred even in the absence of enlargement. Since 2007, about 4.1 per cent of the **EU-2 population** has moved to the EU-15, raising the host country population by a further 0.3 per cent. Of this, just over 50 per cent can be attributed to the enlargement process itself.

The macro-economic impact on individual countries within each of the regions depends on the magnitude of emigration/immigration that has occurred relative to the size of the domestic population. Of the sending countries, the biggest effects are estimated to be in Bulgaria, Romania and Lithuania, where the potential level of output may be permanently reduced by 5-10 per cent as a result of the population shifts towards the EU-15 since 2004. Latvia and Estonia can also expect a permanent scar of at least 3 per cent on the potential level of output in their economies. While remittances can partially offset the negative impact on growth in the short- to medium-term, they cannot fully address the loss of labour input on capacity output in the longer-term. The impact on GDP per capita is much smaller than the impact on total GDP, but also tends to be negative in the sending countries (with the notable exception of Poland), especially given the age structure of migrants, who are predominantly of working age. Migrants from Poland, the Czech Republic and Hungary tend to be biased towards those with higher educational attainment, suggesting evidence of a brain drain from these countries and the decline in average productivity among the non-migrant population acts as a further restraint on productive capacity. GDP per capita may have declined by 0.5-3 per cent as a result of population outflows from Romania, Bulgaria, Latvia, Estonia, Lithuania and Slovakia.

As for the receiving countries, the macro-economic impact of the population shifts **from the EU-8 and EU-2** to the EU-15 since 2004 is expected to be small, possibly raising the long-run level of potential output by up to 0.8 per cent, after allowing for the age profile of the mobile population. The impact on Ireland is expected to be more significant, perhaps raising the potential level of GDP by 3¼ per cent in the long-run. The UK may also benefit from a rise in potential output of nearly 1½ per cent, after adjusting for the fact that most incoming migrants from the EU-8 and EU-2 countries are of working age. The long-run impact on GDP per capita is expected to be negligible, but may be slightly positive, depending on the productive capacity of inward migrants. Outflows of remittances are expected to have only a marginal effect on receiving countries.

Our estimates of the long-run effects on output of the EU enlargement are based on the assumption that all population shifts that have occurred to 2009 are permanent, and we make no assumption about population shifts after 2009. The net emigration rates of **both the EU-8 and EU-2** towards the EU-15 had receded towards pre-accession levels by 2009, so it is not clear how much future population movements can be attributable directly to the enlargement of the EU itself. The limited data available for 2010 from the quarterly Labour Force Survey point to some recovery in emigration rates from Poland, Lithuania and Latvia, although the rate of emigration from the EU-2 continued to decline (albeit from a higher level).

There appears to be clear evidence that the pattern of restrictions in place at the beginning of the 2004 enlargement diverted mobile workers away from traditional destinations – namely Germany – and towards the more easily accessed labour markets in the UK and Ireland. However, we should not over-emphasize the magnitude of this impact, as macro-economic developments and demographics have also played a role in the location decision, and in many cases appear to have played the dominant role. Our simple model estimated for the EU-8 economies falls short of explaining a significant portion of the shifting preference for Bulgarian and Romanian citizens for Italy rather than Spain as the destination of choice, a process which began in about 2007. Transitional restrictions may have played a certain role for the EU-2 economies, although the rise in the unemployment rate in Spain can explain about half of the nearly 10 percentage point loss of EU-2 migrant stock share between 2006 and 2009. While unemployment remained relatively low in Spain in 2007 compared to levels reached in 2008-2011, the differential with the EU-15 average had already started to widen.

Our estimates suggest that by 2009, the unemployment rate in Ireland was somewhat lower by 2009 than it would have been without net population inflows from the EU-8 since 2004, although we estimate that in 2005-2007 the unemployment rate was slightly higher in Ireland as a result of the unexpectedly high inflows of workers from the EU-8. Our estimates point to a slight decline in the unemployment rate in Lithuania in the years immediately following the 2004 enlargement, but this effect should have dissipated by 2009. We would not expect unemployment rates in any country to be permanently affected by the population movements.

The population movements **from the EU-2** have had only a small macro-economic impact on any of the EU-15 economies. The biggest impacts have materialised in Italy and Spain, where GDP has increased by 1¼-1¾ cent as a result of population inflows from Bulgaria and Romania from 2004-2009. The impacts on the sending countries, on the other hand, have been more significant. Our estimates suggest that the level of GDP in Romania will eventually be more than 10 per cent lower as a result of population losses that have occurred since 2004. In Bulgaria the level of GDP will

probably be about 5 per cent lower than it would have been without the loss of labour force that occurred since 2004.

Final transitional restrictions on the free mobility of labour from the EU-8 to the EU-15 were lifted on 1 May 2011. As the existence of support networks for new migrants is one of the most important factors affecting the location decision, any distortion in the distribution of EU-8 citizens across the EU-15 that has resulted from the transitional restrictions is likely to prove permanent. Our estimates suggest that transitional restriction on the free mobility of labour introduced in some countries at the onset of the 2004 enlargement and their extension into the second and third phases of the transitional process, has significantly altered the distribution of EU-8 citizens across the EU-15 economies. Our preliminary results suggest that the long-run effect of these distortions can be expected to raise the potential level of output in Ireland, the UK and Sweden by at least 0.1 per cent, while they will leave a permanent scar on the level of potential output in Germany, Austria, Belgium and Denmark of at least 0.1 per cent.

It is far less clear that transitional restrictions on the free mobility of labour from the EU-2 to the EU-15 following the 2007 EU enlargement have significantly affected the location decision of EU-2 citizens within the EU-15. The most important shift in location share for EU-2 citizens since 2006 has been away from Spain (although net migration continued to be positive) and toward Italy. Both countries had introduced some restrictions on labour market access for citizens of these countries in 2007. Spain lifted all restrictions at the beginning of 2009, while the restrictions in Italy remained in place (although work permits are not required in important sectors), so the existence of restrictions itself cannot explain the shift in location preference towards Italy. These shifts are more likely to reflect factors such as the employment opportunities in Italy compared to Spain, which experienced a severe recession in 2009 and where the unemployment rate soared above 20 per cent last year.

From 1 May 2011, citizens of the EU-10 countries have full access to labour markets across the EU-27, as the final transitional arrangements were lifted at the end of the 7 year transitional period. As of June 2011, workers from the EU-2 still face some restrictions on access to labour markets in Belgium, Germany, Ireland, France, Italy, Luxembourg, the Netherlands, Austria, the UK and Malta. The second phase of the transitional arrangements for the 2007 enlargement will come to an end on 31 December 2011, at which point the governments of these countries will have to decide whether or not to extend the restrictions for a further two years. In principle, restrictions can only be extended during the final phase if the country is facing a 'serious disturbance of its labour market or a threat thereof'. However, in practice there is no agreed definition of what constitutes a serious disturbance of the labour market, allowing a degree of leeway in its interpretation.

The global financial crisis induced a sharp contraction in output in Europe. Labour market responses differed markedly across countries, with sharp rises in unemployment in Ireland and Spain, and limited impact to the labour market in Germany. Our estimates suggest that net population flows from the EU-8 and EU-2 economies were probably about 50-65 per cent lower in 2008 and 2009 than they would have been in the absence of such a sharp recession. The downturn probably reduced population flows to the UK and Spain in particular, while Germany and France gained attractiveness as a location choice due to the relative strength of these economies.

This report also contains six case studies: two on the EU-2 countries (Bulgaria and Romania), and four focused on EU-15 receiving countries: UK, Spain, Germany and Italy. Our case studies have highlighted some interest points.

Bulgaria:

In 2010 about 430 thousands Bulgarians lived in EU-15 countries, predominantly choosing Spain, Germany, and Greece as their main destination countries.

The migrating Bulgarians are predominantly young (about 60 per cent of them are younger than 35 years old) and medium-skilled (about 45 per cent of them are medium-skilled). The shares of low-skilled and high skilled account for 34 and 21 per cent, respectively. A great majority of Bulgarian movers (about 70 per cent) are employed in countries of their destination. About half of them (52 per cent) found work in hotels and restaurants, private households, as well as the manufacturing and construction sectors. About 80 per cent of Bulgarians in the EU-15 are employed in elementary occupations, work as service and sales workers, craft and trade workers, and machine operators and assemblers. Only 11 per cent work as legislators and professionals. The above numbers may suggest that Bulgarians tend to work slightly below their qualifications (downskilling).

According to a recent Eurobarometer survey (2010) economic factors constitute one of the more important motivators behind the decision to emigrate from Bulgaria. Both nominal and real income gaps between Bulgaria and -EU15 countries remain large and are important pull factors for both temporary migrants (in terms of sending remittances) and long term movers (in terms of better living and working conditions).

A number of studies emphasise risks of a brain drain for the Bulgarian economy (Belava, 2009, Markova, 2010). While this is one of the negative consequences of migration, a closer look at the skill structure of the migrating population in comparison to the skill structure of the Bulgarian population shows that 21 per cent of migrants are highly skilled (i.e.: hold a university degree), compared to a countrywide

share of 23 per cent of Bulgarians. Moreover, enrolment rates in tertiary education in Bulgaria have increased in recent years, and they are somewhat higher than the EU-27 average (although much lower than enrolment rates in Slovenia, Lithuania and Poland).

In 2008 the Bulgarian government published a national strategy on migration policy which aims at attracting Bulgarian citizens and foreigners, especially high-skilled, to return and settle down in Bulgaria. This may influence the dynamics of net migration from Bulgaria, which in recent years has been exceptionally high - about 3.4 per cent of Bulgarian population emigrated between 2004-2009.

Romania: In 2010 about 2 million Romanian nationals, that is about 7 per cent of the Romanian population, lived in the EU-15 countries. They resided predominantly in Spain and Italy, the two large countries of Southern Europe, which attract about 83 per cent of all Romanians wishing to work abroad. Romanian mobile workers are rather young (about 60 per cent of the migrating population are below 35) and low- and medium-skilled (about 88 per cent of Romanian migrants do not have a university degree). They are employed predominantly in elementary occupations and as craft and related trade workers in manufacturing and construction sectors, as well as in private households. We find that depending on the country of destination the skill and occupational structure of mobile Romanians change somewhat. Italy and Spain attract lower-qualified workers, while Germany is a popular destination among high-skilled workers.

Existing studies (Mara, 2010, Ferri, Rainero, 2010, Potot, 2010) suggest that Romanian migration is to a relatively large extent circular, both due to geographical proximity and large amounts of seasonal and temporary work. Annual outflows from Germany in particular are high. The temporary character of Romanian migration may also be illustrated by the relatively high levels of remittances sent by Romanian nationals to their home country. According to the World Bank data, in 2009 the value of remittances sent by Romanians working abroad amounted about 3 per cent of Romanian GDP and was one of the largest among the EU-8+2 countries. Results of a field survey by Sandu (2010) show that the opportunity to improve one's living conditions at home is one of the important aspects of work abroad (in particular, about 56 per cent of those with experience of migration for work purposes claim that their plan for the next 2-3 years is to improve conditions in their current house; 27 per cent plan to open a business).

Large income gaps between Romania and the EU-15 countries make the option of working abroad attractive - both for circular and temporary migrants, and to a lesser extent long term migrants. Nominal GDP per capita and wages in the EU-15, taken into account by circular and temporary migrants who may migrate with the aim of

sending remittances, are about 5 times higher than GDP per capita and wages in Romania. Real gaps are somewhat smaller (2 to 3 times of the Romanian level). Although Romania is catching up, the wide income gaps, which are expected to persist for several years, suggests that migration from Romania to the EU-15 countries is likely to continue, although possibly at a slightly slower pace than before. The pent-up demand to emigrate has largely been relieved by high rates of emigration since 2004. Since 2007 the net migration rate has slowed down somewhat, although to some extent this has been driven by the global financial crisis and serious recessions in Italy and Spain.

Spain: The migration phenomenon in Spain has attracted a lot of attention over the last ten years. Since the late 1990s the number of migrants in Spain increased dramatically. Looking at the stocks of migrants for the period 1 January 2008-2011 from the municipal registers (which is considered a reliable source to measure the presence of migrants in Spain, as it covers both legal and illegal migration), the number of Bulgarians and Romanians residing in Spain has continued to increase, though at a much lower rate than in previous years (the largest increase took place between 2006 and 2008). However, looking at the estimations of inflows and outflows we can identify a large drop in the migration inflows from Romania for the period 2008-2009 (particularly inflows coming during the year 2008).

As a result of the economic crisis, however, employment prospects of immigrants in the Spanish labour market have worsened significantly with decreases in employment particularly amongst the foreign-born population. Migrants from Bulgaria and Romania have suffered the consequences of the economic crisis to a larger extent, which has been widely attributed to the adverse developments in the construction sector. The rise in unemployment rates during 2008 and 2009 amongst migrants, however, was not due only to the employees losing their jobs, but also reflected the increase in the numbers of migrants participating in the workforce. Resident permits statistics show that the number of Romanian and Bulgarian continued to increase during the recession years, although to a lesser extent than it had done previously. However, in the short-run our understanding of the real magnitude of the inflows and outflows of migrants remains limited. A key issue is the distinction between regularisation of existing migrants from the measuring of new waves of migrants. Recent data show that net inflows of foreign-born migrants coming from abroad have decreased substantially since 2007, affecting the Romanian population in particular.

United Kingdom: nationals of the EU-8 were allowed free access to the UK labour market in May 2004, leading to a considerable rise in immigration to the UK from these countries. In comparison, access to the UK labour market has been much more limited for nationals from Bulgaria and Romania following their accession to the EU in 2007.

Nevertheless, the data suggest there has been a sizeable increase in the number of Bulgarians and Romanians migrating to the UK following the 2007 enlargement. National Insurance Number allocations to Bulgarians and Romanians increased from just over 4,000 in 2006 to more than 30,000 in 2007.

On average, migrants from both the EU-2 and EU-8 appear to have higher education levels than other foreign-born migrants resident in the UK (as measured by age on leaving full-time education). However, there is some evidence to suggest that they tend to earn lower wages than other immigrant groups. Both EU-2 and EU-8 migrants were more likely to be in employment than migrants from other countries, and also were more likely to be in employment than the native population.

There is some indication of a fall in the number of migrants from both the EU-2 and EU-8 coinciding with the economic downturn, but it cannot be said categorically whether this is the result of the recession. At the same time, some impact has also been observed on the distribution of immigrants within the UK, with some increase in the proportion locating in London.

Italy: from 1 January 2007 to 1 January 2008 the number of Romanians living in Italy almost doubled. This reflects the entry in the European Union, as illegal migrants cannot be inscribed in the municipalities' registers (this is in contrast to Spain, where they can). The number of migrant residents continued to increase considerably after the beginning of 2008 (27 % growth rate to 1 January 2009 and 11% in year to 1 January 2010). The number of Bulgarians in Italy is much lower but has also increased at similar rates. We find that the number of female residents of EU-2 countries has increased at a slightly faster rate. The North-West and North-East regions of Italy absorb the majority of the Romanian migrants.

The most common occupations for EU-2 migrants resident in Italy were craft and related workers and elementary occupations, both of which accounted for around one third of all employed migrants from Bulgaria and Romania. In 2009, the construction sector employed a larger share of EU-2 citizens living in Italy than any other sector, followed by the manufacturing sector and the private households sector. The employed EU-2 and EU-10 migrants are less likely to hold a university degree than natives, but the percentage with secondary education is higher. This was also observed in the Spain's case study where information on employment from Social Security records (by country of birth) was available.

With regards to the employment performance of migrants we see that the average unemployment rate for EU-2 citizens residing in Italy is higher than for the Italian population and has also increased more rapidly during the recession.

Germany: Prior to the enlargement in 2004, Germany was expected to be the most affected country by post-accession mobility, due to the large pre-existing EU-8 resident population and its geographical proximity to the EU-8 countries, in particular the largest country, Poland. Although some estimates of the migration potential have proved broadly accurate in terms of total numbers of migrants to the EU-15, the shift towards the open access countries Ireland and the UK had not been fully anticipated. Germany maintained restrictions on labour market access for citizens of the EU-8 countries for the maximum period of 7 years and experienced only moderate new immigration from the EU-8 from 2004-2011. Germany also maintained restrictions on labour market access for EU-2 nationals since the 2007 enlargement. A new immigration law passed in 2005 provided more change in the access to the labour market for EU-8 and EU-2 citizens than the accessions themselves. The restrictive policies towards mobility from the EU-8 and EU-2 resulted in irregular outcomes, such as the misuse of the freedom of services and freedom of settlement/establishment. In the context of Germany's rapid population ageing, lack of highly skilled professionals, and overall good economic shape with declining structural unemployment, less restrictive policies towards EU-mobility may benefit the economy.

We identify two clear areas where further research would be of benefit. The first is the returns to education of the mobile population. Do workers become more or less productive when their location changes? Does this depend on the quality of capital in use or is it a reflection of language barriers and location specific qualifications or other factors that may make skills difficult to transfer across countries. The other area that needs further development is modelling the determinants of emigration flows. We report an assessment of the Brücker (2007) model developed by the European Integration Consortium (2009) in an appendix to this report. This study was intended to provide the empirical underpinnings of our report, but proved inadequate for some of the questions addressed by this study. The estimates reported here could be improved by the development of an explicit model for the rate of emigration from the sending countries, or even a model of bilateral migration flows within the EU. A further area that would benefit from additional research is the determinants of the location decision of EU-2 citizens residing in the EU-15 or EU-25. Transitional restrictions do not appear to have played as important a role as they did following the 2004 enlargement, and a simple model that also takes into account GDP per capita, unemployment and demographics leaves a significant share of location shifts since 2007 unexplained. A more elaborate model should consider the type of restrictions on labour market access in place, rather than the simple restriction versus no restriction model developed here. Linguistic and cultural factors may also prove important.

Our preliminary analysis of available data for the candidate countries of Croatia, FYR Macedonia, Albania, Bosnia and Herzegovina, Montenegro and Serbia highlights the small size of these countries. While GDP per capita is low relative to the EU average, especially in Albania and Bosnia and Herzegovina, even if emigration rates from these countries were high upon accession to the EU they would be expected to have negligible impact on the receiving countries in the EU.

3. Assessment of enlargement and transitional arrangements

This chapter of the report begins with a brief review of some of the key issues to consider in an assessment of the impact of EU enlargement on labour mobility and through this route on the macro-economy, and reviews some of the important findings in the literature. We next go on to discuss the available data sources for migration statistics, and compare the levels and growth rates of the different sources for the key statistics on which we base our assessment of the impact of EU enlargement on labour mobility. The following section looks at some of the overall patterns of migration between the EU-8 and EU-2 countries and EU-15 countries as an introduction to the analysis that follows. We also briefly review the magnitudes of flows from the EU-2 to the EU-10 economies, which have tended to be small for the most part. We then estimate the macro-economic impact of population flows between the EU-8 and EU-2 countries and the EU-15 countries since 2004, based on a series of simulations using the National Institute Global Econometric Model, NiGEM. These preliminary estimates are then fine-tuned to take account of the age structure and productivity level of migrants relative to the host and sending countries. In the following section, we adopt a simple methodology to quantify the share of that impact that can be directly attributable to the 2004 and 2007 EU enlargements, factoring out the impact of migration flows that would have been likely to have occurred even in the absence of the EU expansions. In the next section of this chapter we consider the impact of transitional restrictions on labour mobility put in place following the two enlargements on the location decision and distribution of EU-8 and EU-2 citizens across the EU-15 countries. We apply some of the results of a simple model developed in this section to assess the impact of the 2008-2009 recession on population flows, and finally consider the outlook for migration patterns over the next several years.

3.1 Key issues highlighted in the literature³

Free movement of workers within the EU was achieved in 1968 and acts as one of the four pillars of the EU Single Market. While the policy was introduced with aim of removing barriers to the functioning of a fully integrated market economy in Europe and improving the matching of labour supply and demand, concerns regarding the sudden shock of opening labour markets in existing member countries have been an issue in all subsequent enlargements where a significant wage differential existed between new and old member states (1981, 1986, 2004 and 2007). While in the long-run, free mobility can be expected to raise potential growth in the EU as a whole, the shock to labour markets and wages may have negative impacts on host economies in

³ Any comments or queries related to section 3.1 of the report can be addressed to Paweł Paluchowski (p.paluchowski@niesr.ac.uk) or Tatiana Fic (t.fic@niesr.ac.uk).

the short-term. To counter-act these factors, member states have been allowed to temporarily restrict the free mobility of workers from acceding countries for a period of 5 years in general, and up to 7 years under certain circumstances. These transitional arrangements are intended to smooth the shock to labour markets of the enlargement process.

The significant wage differentials between the acceding countries and the EU-15 countries have been a cause of concern for some EU-15 countries' governments. The high discrepancy in wages, in combination with free movement and spatial proximity, was believed by some governments to potentially trigger a mass influx of workers from the EU-10+2 which could be impossible to manage in an adequate manner. Temporary restrictions on labour market access were permitted in order to allow for a gradual adjustment of the labour markets.

Within the first 2 years of accession, the EU-15 Member States (and EU-25 in the case of the 2007 enlargement) were allowed to restrict access to the labour market without reservation and enforce national policies, although no restrictions on general travel were permitted. While workers may require a work permit during this transitional period, they would still be given priority over workers from non-EU countries. Before the end of these first 2 years, the Member States had to notify the European Commission if they decided to extend these restrictions into the 3 consecutive years. Thereafter, a country is allowed to extend restrictions for 2 more years, but only upon notification to the Commission of serious disturbances in their labour market or a threat thereof. There is no agreed definition of what constitutes a serious disturbance of the labour market, and this requirement does allow a significant degree of freedom in its interpretation.

While Ireland, Sweden and the UK removed all substantial restrictions on labour market access from the onset of the 2004 enlargement, other states followed successively (see table 3.1). Germany and Austria were the only countries which extended substantive restrictions on labour market access to the maximum amount of 7 years (Galgóczi, Leschke & Watt, 2010).

The transitory arrangements appear to have had a diverting effect, at least following the 2004 enlargement, as EU-8 mobility predominantly affected Ireland and the UK, two of the three countries without restrictions on labour market access. The European Integration Consortium (2009) comes to the conclusion that transitory arrangements have had a slight but significant impact on restricting movement to the EU-15 as a whole. It has to be noted that although transitory arrangements constituted a barrier for mobility, they did not exclude labour market access. However, they could discourage individuals from moving to countries with higher levels of restrictions, favouring locations without barriers to movement. Indeed, such a shift of EU-8 flows

towards Ireland and the UK and a diversion of EU-2 streams to Italy and Spain could be observed (Kahanec, Zaiceva & Zimmermann, 2009).

Table 3.1. Year when free access to the EU-15 labour market granted for workers from the EU-8 and EU-2 countries

| EU-15 Member States | EU-8 | EU-2 |
|---------------------|------|--------------|
| Belgium | 2009 | Restrictions |
| Denmark | 2009 | 2009 |
| Germany | 2011 | Restrictions |
| Ireland | 2004 | Restrictions |
| Greece | 2006 | 2009 |
| Spain | 2006 | 2009 |
| France | 2008 | Restrictions |
| Italy | 2006 | Restrictions |
| Luxembourg | 2007 | Restrictions |
| Netherlands | 2007 | Restrictions |
| Austria | 2011 | Restrictions |
| Portugal | 2006 | 2009 |
| Finland | 2006 | 2007 |
| Sweden | 2004 | 2007 |
| UK | 2004 | Restrictions |

Source: <http://ec.europa.eu/social>.

Notes: "Restrictions" indicates that the EU-15 country maintained restrictions on EU-2 workers in the second phase of the transitional arrangements (1st January 2009-31 December 2011), at least until June 2011 (date of finalisation of this report).

As other countries have now abolished their restrictions on workers from the EU-8 and the economic situation is comparably worse in the UK and Ireland, Pollard, Latorre and Sriskandarajah (2008) concluded that workers from EU-8 are very likely to move to other EU-15 countries. However, with large diasporas of EU-8 nationals in the UK and Ireland, at least part of the distortions to the distribution of EU-8 nationals across the EU-15 is likely to be permanent. As Delbecq and Waldorf (2010) point out, the network effect was identified as having the biggest impact on mobility flows from the EU-10 and EU-2 in their study.

Drivers of labour mobility in the EU

According to the surveys carried out by Eurofound (2007), the main causes of international labour mobility from the EU-10 and EU-2 are of economic nature, including higher income potential and better working conditions. There is little evidence that citizens of the EU-10 and EU-2 are attracted to the EU-15 countries because of their welfare systems and better public services.

The majority of migrants from the EU-8 to East England, for example, expressed that they intended to stay only temporarily. They were attracted by higher wages and better employment prospects and hoped to be able to save up money and to invest

upon return (Schneider and Holman, 2009). This highlights that mobility can be seen as a step in an individual's career-building.

The fact that economic disparities between countries drive migration to the EU-15 countries is reflected in the age profile of the foreign citizens moving to the EU-15 countries. Most of the arriving EU-10+2 citizens are in their working age. Although in some countries, the stock of EU-10+2 nationals is largely female, recent flows were characterized by only a slight over-representation of women (Eurofound, 2007).

Theories of migration

Following the accession of the EU-10 countries, many new EU nationals moved to the EU-15, in particular to the unrestricted labour markets in Ireland and the UK. Different concepts of migration are based on different ideas about the motivation and pattern of international labour mobility. The following overview will briefly introduce the most influential theories and discuss their relevance for the mobility of workers from the EU-10+2.

Push-Pull

The Push-Pull-Theory of migration assumes that there exist factors which attract immigration (pull) and generate emigration (push) (Lee, 1966). In case of wage disparities, the push will be the low salary in the nation of origin while the relatively higher salary constitutes a pull factor. This general model of migration allows for a consideration of many factors that might influence mobility at the macro-scale. Especially useful proves the distinction between push and pull factors. High unemployment rates in some EU-10+2 countries such as Poland have been identified as one of the push-factors (European Commission, 2008). A negative pull-factor was the financial crisis, which is believed to have led to a slowing of the inflow from the EU-10 and EU-2 to EU-15 countries (Koehler *et al.*, 2010).

Gravity theory of migration

Derived from Newton's theory of gravity, the gravity theory of migration is based on two basic assumptions. First, the concept assumes that the size of flows between places will occur in both directions and that they will be proportional to their population size. Secondly, the magnitude of flows will also be inversely proportional to the squared distance between the places of origin and destination (Greenwood, 1985). Although this theory is useful to describe internal mobility, it fails to capture the extent and directions of recent EU mobility streams from the EU-10+2, as distance has become less important for EU mobility in the age of cheap transport.

Network migration

Recent studies have documented the importance of networks for international mobility. The pre-existence of migrant diasporas proves to be an influential factor for

the choice of destination as help with housing, institutional barriers, search for employment, and language barriers is provided.

Apart from remittances, exclaves send back information to their home countries which encourages further moves. Delbecq & Waldorf (2010) find that the network effects most accurately explain East-West mobility since the 2004 and 2007 enlargements. Distance, as well as institutional factors, seems to have lost their importance and play only a marginal role.

Human capital theory

Sjaastad's (1962) human capital theory of migration conceptualises labour mobility as an individual investment. Individuals move if the benefits of a move exceed the costs. Thus, individuals seek places with better chances of employment and higher salaries. In addition to labour migration for better jobs, student mobility can also be seen as an investment in one's education. As previously described, EU-10+2 nationals regard their move to the EU-15 as such an investment in their future.

Effects of EU post-accession mobility

Remittances

When discussing the effects of immigration, it is important to distinguish between effects on the host country and effects on the sending country. Sending countries tend to suffer from the loss of productive capacity, but benefit from remittances, which are sent back by workers to their families and boost private consumption. Remittances reflect a loss to the host country, as consumption is lowered and the fiscal contribution of foreigners through indirect taxes decreases. The level of remittances has increased significantly in all EU-8 and EU-2 countries since accession. In particular the EU-2 countries have been benefiting from a high level of remittances. However, in 2009, the level of remittances to the EU-8 and EU-2 declined after years of growth, in the aftermath of the financial crisis, as a result of higher unemployment and return flows of EU-10 workers (Comini & Faes-Cannito, 2010). Remittances play a vital role to the economies of the EU-8 and EU-2, in particular to the EU-2 where they constituted around 5 per cent of GDP of Romania and Bulgaria in 2007 (Dietz, 2009).

Remittances can thus be a partial compensation for losses in sending countries that result from the loss of potential labour input and also potentially a so-called 'brain drain'. A brain drain occurs when there is a substantial emigration of highly qualified workers, reducing the average skill level in the sending country overall or in a specific sector. Transitional restrictions on labour mobility may have encouraged a brain drain to some extent, as they are more likely to have restricted low-skilled labour mobility than highly skilled mobility. Furthermore, highly qualified individuals from the EU-8

and EU-2 were more likely to move to the EU-15. In the years following the EU enlargement, sectoral brain drains could be observed such as for example the exodus of health professional from Poland.

Labour Market

There is an ongoing debate about potential effects of labour mobility on host countries, which is the reason why transitional restrictions have been enforced, as some EU-15 governments feared detrimental effects of an inflow of labour from the EU-10+2. The main potential economic effects discussed are the impacts on GDP growth, salaries, unemployment, social security systems, and inflation.

The effect of inward migration on wages has been controversially discussed (Reed and Latorre, 2009). On the one hand, wages are believed to decrease if foreign workers undercut existing price levels. Besides the undercutting argument, the labour supply shift argument would support a wage dampening effect. Foreign workers increase the supply of work and thus, decrease the wage in the equilibrium, at least in the short-term. On the other hand, undercutting of wages is limited in countries with a national minimum wage. Empirical evidence suggests that foreign labour had a marginally negative effect on the wage level of native workers (Reed and Latorre, 2009).

Although there is some evidence that inflows of foreign workers might take away jobs from the native population and increase the level of unemployment, others find that foreign labour can fill labour gaps and skills gaps and thus, will not increase unemployment (Münz et al., 2006). Furthermore, the number of jobs is not fixed in the long-term and foreign citizens are observed to have a higher entrepreneurial activity than native workers in many countries. Empirical evidence suggests that the influx of foreign labour does, if at all, only marginally increase unemployment in the short-term, with no long-run effect (Reed and Latorre, 2009).

Baas, Brücker and Hauptmann (2010) show that a distinction can be made between winners and loser amongst the workers. While less-skilled workers in the host states are more likely to suffer job losses and wage depression in the short-term in response to inward migration, high-skilled workers tend to benefit. The opposite is true for the sending countries.

The labour market impact of the accessions in 2004 and 2007 and successive population movement has been widely studied. In particular labour market effects in destination countries have drawn the interest of researchers who tried to quantify the impacts of post-enlargement mobility.

Galgóczi, Leschke and Watt (2009) find that the effects of post-accession mobility from EU-2 and EU-8 countries were small and do not suffice to support the

hypothesis of substantially lowering wages and increasing unemployment in receiving countries.

Sumption and Sommerville (2009) also argue that the increase of the workforce due to post-enlargement mobility is small compared to other migrant shocks such as the influx of Russian Jews to Israel in 1990 and 1991, which were found to have had insignificant labour market outcomes. The authors point out that labour markets are dynamic and should be able to absorb foreign labour inflows of these magnitudes.

The UK has experienced one of the largest inflows from EU-10+2 workers, in particular from the EU-8 countries and is thus one of the more interesting countries to study in terms of macro-economic labour market impact. Gilpin et al. (2006) show that the influx of EU-8 citizens had no impact on the unemployment rate of the native population.

Furthermore, Lemos and Portes (2008) demonstrate that post-accession mobility did not significantly increase unemployment for native subgroups such as women, young citizens or low-skilled workers.

Dustmann, Frattini and Preston (2008) conclude in their investigation that the migration flows to the UK following the EU enlargements had an overall positive effect on wages. The researchers attribute this to downgrading. When foreign workers receive lower wages for their labour than the product's value, this creates a surplus. The study however shows that wages were lowered at the bottom end of the wage distribution spectrum.

With the use of the econometric model NiGEM, Barrell, Guillemineau and Liadze (2006) show that unemployment in the UK increased in the short term due to inward migration from the EU-8, but decreased in the medium run, and returned very close to the baseline scenario in the long run.

In a more recent study of similar design, Barrell, FitzGerald and Riley (2010) find that in the short term, unemployment increased by about 1 percentage point in Ireland and 0.25 percentage points in the UK due to the inflow of EU-8 citizens. In the long run, the study finds no significant effect for the UK and a slightly positive effect for Ireland.

Using a regression analysis of economic impacts of recent migration to the UK, Reed and Latorre (2009) conclude that the overall impact of migration on wages was slightly negative. The authors estimate that a 1 percentage point increase in migrants as a share of the workforce would decrease wages by 0.3 per cent. The authors do not detect a significant effect of migration on unemployment in the UK.

For the EU-15, the European Integration Consortium (2009) reports that the inflow of the EU-8 nationals from 2004 to 2007 had only accounted for a decrease of the average wages of 0.09 per cent in the short run and none with regards to the long run. The inflow from the EU-10+2 to the EU-15 was found to have a small negative impact on unemployment of 0.06 percentage points in the short run and 0.02 percentage points for the long run.

A study by Baas, Brücker and Hauptmann (2009) puts the short run effect of mobility from the EU-8 on UK wages at -0.09 per cent points. EU-8 mobility is estimated to have increased unemployment by 0.06 percentage points in the short run. The study states that there is no long term impact on unemployment and wages.

In their analysis, Baas and Brücker (2010) examine the macroeconomic impact of the EU enlargement on Germany and the UK. Thereby, the study does not focus on mobility alone but also includes trade and capital movements. The study estimates that wages have been increased by 0.3 per cent in the UK and 0.8 per cent in Germany. According to the results of the study, the enlargement as a whole had a positive effect on employment as employment was increased by 1.3 per cent in the UK and by 1.1 per cent in Germany. In analogy, the unemployment rate was reduced by about 0.6 percentage points in both countries.

Overall, a review of the studies suggests that there has been no, a small negative, or even a small positive labour market effect in the destination countries while the long run impact is believed to be very small or none.

For sending countries, negative effects could potentially arise from a loss of specialized workers. Indeed, evidence points in such a direction (Kahanec, Zaiceva, and Zimmermann, 2009). On the other hand, emigration would lower the unemployment rate if EU-8 and EU-2 citizens emigrated who could not otherwise find employment in their country. Rutkowski (2007) points out that EU-8 and EU-2 labour markets are only to a small extent affected by recent emigration trends. Kaczmarczyk and Okólski (2008) support this finding with the claim that fast economic expansion and increasing demand are significant influences on the EU-8 and EU-2 labour markets.

In their study, Barrell, FitzGerald and Riley (2010) assess the labour market impacts of post-enlargement mobility for two EU-8 countries: Poland and Lithuania. Recent mobility lowered the Lithuanian unemployment rate by almost 1 percentage point in the short term. The long term impact is above -0.5 percentage points. The effects are smaller in Poland. The Polish unemployment rate was decreased by about 0.5 percentage points in the short term but there is no effect for the long run.

Housing

A mass influx of foreign workers from the EU-10+2 is very likely to increase house prices, as a study on post-accession labour mobility to Ireland shows (Duffy, FitzGerald and Riley, 2005). As foreign workers tend to cluster geographically, EU labour mobility is also likely to increase regional disparities between house prices. Particularly high house and rent prices are usually found in urban gateway regions such as London or Frankfurt. Often, international moves occur in several steps. In a first step, foreigners arrive in the gateway region and subsequently move to other regions.

The strains put on the host country's housing market may offset other economic benefits from immigration. The common perception that EU-8 and EU-2 citizens strain the welfare system by having a higher demand for social housing is incorrect. Dustmann, Frattini and Halls (2005) demonstrate that citizens of EU-8 countries who arrived in the UK after accession are 57 per cent less likely to live in social housing than native residents.

Growth

Labour mobility can be expected to have a significant effect on economic growth. First, a mass arrival of foreign workers will increase the total number of the labour force so that the GDP will tend to increase in level terms. More interesting is the question as to whether international labour mobility increases economic growth per capita. Thus, this question is linked to the matter of productivity. Huber *et al.* (2010) discuss how foreign labour may be able to increase productivity by innovation, labour gap filling and enhancing of new technology adoption.

The effect of EU mobility on productivity will be highly dependent on the skills level of the foreign workers. If foreign workers take up higher paid jobs which require a higher skill level, they will contribute more taxes than in low paid occupations. However, downskilling, or taking up employment below the qualification level, has been a quite common phenomenon for EU-8 mobile labour (Sumption and Sommerville, 2009).

Contrary to the host countries, sending countries may be negatively affected by the outflow of skilled workers. However, the outflow of workers from the EU-10+2 may not necessarily reflect a long-term brain drain, as many newly mobile workers plan to work in another EU country for while and subsequently to return to their home country. This "brain circulation" can create a win-win situation. The influx of foreign labour can fill temporary labour gaps in the receiving country. Although this

phenomenon might have a dampening effect on the sending countries' economies in the short term, the remittances can compensate for this to a certain degree. Moreover, productivity of foreign workers increases and returnees tend to be more productive than before they left, raising potential output in the home country (Barrett and O'Connell, 2001; Co, Gang and Yun, 2000).

Generally, although international mobility tends to have a downward effect on sending countries in the short term, the long term effects should be very small, especially in terms of per capita output (Barrell, FitzGerald and Riley, 2010).

Simulation results in Barrell, Guillemineau and Liadze (2006) suggest that the economic output will rise slightly more than employment in the long-term in the host countries.

D'Auria, McMorrow and Pichelmann (2008) report results based on simulations with the Quest model, and show that estimated impact on GDP is largely proportional to the magnitude of inflows as a share of the domestic population. The cumulative impact on GDP of flows between 2004 and 2007 were found to be a rise of 4.2 per cent for Ireland, 1 per cent for the UK and 0.4 per cent for Austria. In the other EU-15 countries, the cumulative impact on GDP was found to be up to a rise of 0-0.2 per cent, as the magnitudes of inflows were small relative to the size of the domestic population. In contrast to the host countries, the sending countries experienced a cumulative loss of real GDP due to heightened mobility. The cumulative losses were measured to be -4.7 per cent in Lithuania, -3.5 per cent in Latvia, and -2.1 per cent in Poland and Slovakia. The loss in other EU-10 countries was found to be less substantial.

In a study of the economic effects of the 2007 enlargement, Breuss (2009) finds that there has been a slight negative long-run impact of mobility on real GDP in Romania and Bulgaria of -0.05 per cent and -0.07 per cent of real GDP respectively. The effect on the EU-15 was found to be practically none.

Fiscal Effects

Research furthermore discusses fiscal implications of labour mobility. Empirical studies found that foreign workers make a net fiscal contribution to the state such as current EU labour mobility from the EU-8 countries to the UK (Dustmann, Frattini and Halls, 2010). However, Gott and Johnston (2002) conclude that the fiscal contributions will significantly differ between groups. Some groups might draw more resources from the state than they contribute, which will mainly depend on their age patterns, employment rate and skill level as well as the welfare system of the host country.

Demographic Effects

European societies are amongst the most mature and fastest ageing in the World which will put a large strain on the existing health and pension systems. As foreigners exhibit a younger age profile than the resident population at the time of their move, international mobility has a rejuvenating effect (Bongaarts, 2004). While host countries benefit from the demographic effect, sending countries will experience negative effects from higher old age dependency rates. The EU-8 and EU-2 exhibit low fertility levels and a net outflow of people in their working age will aggravate the pension situation in these countries.

The effect of transitional restrictions

The three phases of the transitional arrangements were established to allow for a stepwise adjustment of economical disparities between EU-15 countries and the EU-8 and EU-2. Some EU-15 governments argued that the instantaneous abolishment of restrictions would immediately lead to an immense influx of foreign labour that could not be dealt with quickly enough. In their paper Breitenfeller et al. (2008) state that joining the EU increased mobility by 17 per cent. They suggest that the increase may have been larger without restrictions, and this was also the conclusion of the European Integration Consortium (2009).

In practice, most studies suggest that the restrictions redirected potential foreign workers to EU-15 countries with easier access to labour markets (Münz and Tamas, 2006; European Integration Consortium, 2009; Barrell, Riley and FitzGerald, 2010; and others). Delbecq and Waldorf (2010), however, found only a weak effect of transitional restrictions on migration patterns, with little shift in destination preferences following EU accession, which leaves the question of the role of transitional restrictions on the location decision open.

In those countries that lifted restrictions on labour market access early on, few studies have identified any major negative effects on the economies. However, in those countries that retained restrictions for a period some negative side-effects have been observed. The restrictions appear to have encouraged irregular forms of labour mobility in the respective countries. Some EU-8 and EU-2 citizens might have chosen alternative or illegal routes to employment. Since the free movement *per se* ceased to be restricted, it would have been easy to move on a tourist or student visa and to overstay the permitted duration and to enter the labour market in an irregular channel.

Self-employment also became unrestricted following accession, and the significant rise in EU-8 and EU-2 citizens officially declared as self-employed since 2004/2007 may reflect an abuse of this channel of entry into the labour market. For example, Kausar (2011) shows that almost half (46 per cent) of Bulgarian and Romanian migrants in the UK were self-employed (based on the period 2004-2009). This is

much higher than for EU-8 migrants (11 per cent), other migrants (15 per cent) and UK-born (13 per cent). Fellmer and Kolb (2009) found a similar effect in Germany, where many workers, especially in the construction sector, were hired by companies but registered as self-employed. The registered self-employed did not have to pay into the unemployment and pension insurance systems and could offer their work for significantly lower wages. The main problem with undeclared work is that workers fall outside the tax net. They are also more likely to under cut minimum wages in low-skilled jobs and might result in the observed unemployment rate if this costs jobs among registered members of the labour force.

Postings have also provided an alternative route into the labour market. A posted worker is one who is employed in one EU Member State but sent by his employer on a temporary basis to carry out work in another Member State. While statistics on postings are limited, an external report for the European Commission (VT/2009/062) on posting of workers in the EU suggests that posting represents a sizeable phenomenon (on average 18.5% of the stock of EU-27 non-nationals in the labour force) and that more than one third of posted workers are sent by EU-10 and EU-2 countries. This may indicate an excessive use of this indirect route into the labour market during the period of transitional restrictions. Germany and Austria have restricted postings in certain sectors during the transitional period. Where free access to the labour market has not yet been implemented, country regulations generally made exceptions for specific groups (skills, worker-scheme, sector, etc.) of EU-8 and EU-2 nationals. Thus, entering restricted labour markets was more difficult, but far from impossible.

Impact of the economic crisis

The recent economic crisis was responsible for having slowed down the inflow of EU-8 and EU-2 workers to EU-15 countries, in particular to the UK and Ireland which previously attracted a large proportion of mobile workers from the EU-8 (Koehler *et al.*, 2010).

Due to the worsening of employment prospects in destination countries in the entire EU-15 area, the influx of workers from the EU-8 and EU-2 decreased. However, the economic situation also worsened in the sending countries, especially in the EU-2 states. This means that the economic situation in the EU-15 still constituted a pull-factor for some citizens from the EU-8 and EU-2. Since the situation in the EU-8 countries was generally less grave, a shift in the composition of labour flows towards higher proportions of EU-2 workers can be expected (Kahanec, Zaiceva and Zimmermann, 2009).

Furthermore, foreign workers were more vulnerable to the loss of unemployment due to their relatively young age and their sectors of employment (the crisis-stricken

sectors of construction, retail and hospitality). Since male workers from the EU-8 and EU-2 were more likely to be employed in sectors affected by the crisis than females, they were equally more prone to job losses. Foreign workers could basically cope in two different ways with an eventual job loss: they could either leave the host country or stay (Koehler *et al.*, 2010).

Individuals who decided to return might have simply been encouraged by the crisis to leave earlier than planned. Some workers from the EU-8 and EU-2 might have felt a social pressure to leave or would find the employment situation too strained. In general, highly qualified workers would be more likely to return, as they would find it easier to find a job in their home country. Barrell *et al* (2009) investigate the impact of the recent recession and potential different levels of scarring on equilibrium output on migration stocks and flows. In particular they suggest that the stock of migrants, mainly those from the EU-8, in the UK would fall by approximately 350,000 permanently because the UK faces a larger scar from the crisis than the home countries, and especially than Poland where output has not fallen. The per cent effect on the potential workforce in France and Germany, for instance, was noticeably smaller, partly reflecting the fact that new migration from the EU-8 remained limited as long as transitional restrictions to mobility remained in place.

Although increased return rates from some EU-15 countries could be observed, there has not been a wave of mass returns. A significant portion of the workers from the EU-8 and EU-2 decided to stay in the destination country. Since the economic situation in the sending countries also deteriorated as a consequence of the crisis, the incentives of staying and “waiting out” were high so that emigration rates did not rocket (Koehler *et al.*, 2010). Where transitional restrictions persist, there may also have been an incentive to remain in the host country after becoming unemployed, due to the uncertainty of being permitted to return once economic conditions improve.

Stayers might have opted for searching for a job in a different sector or switching to self-employment. This was reflected in an increased inter-sectoral mobility. Some stayers may also have chosen to apply for unemployment benefits or to drift into irregular forms of employment. The countries with a high proportion of stayers would thus record a higher increase in unemployment rates and irregular economic activity.

Education, skills and labour market performance

Recent EU-mobility is largely characterised by short- and medium-term moves. Many workers from the EU-8 and EU-2 do not have the intention (at least initially) to permanently stay in the host country (Drinkwater, Eade and Garapich, 2009). Rather, many regard their stay as an investment so they can earn more money, of which a significant portion is sent home as remittances, and gain skills, qualification, status and money.

In the pursuit of these objectives, workers from the EU-8 and EU-2 have been inclined to temporarily take up employment that requires a lower skill set than they themselves offer, and lower than they would be willing to accept in their home country. Despite their relatively high skill level, EU-8 and EU-2 workers in the UK are concentrated in some jobs with a lower skill profile. This circumstance is particularly striking with regards to EU-8 and EU-2 workers with tertiary education. The so-called downskilling may be due to a variety of factors, some of which are discussed by Wadsworth (2010). Employers might be hesitant to employ EU-8 and EU-2 citizens for high skilled jobs. EU-8 and EU-2 nationals might exhibit a preference for temporary work or simply take up employment that is more readily available and subsequently search for something more permanent, better paid and higher skilled employment. In a survey of foreign workers in the British region East Anglia, Schneider and Holman (2009) found that language barriers and the non-recognition of qualifications and skills constituted barriers to a successful integration into the labour market. With time, new arrivals should be increasingly able to integrate into the job market. This hypothesis might be supported by the finding that higher skilled workers tend to exhibit longer durations of stay in a comparison across EU-15 countries (European Commission, 2010).

Brain Waste is a term which refers to the downskilling of immigrant labour. Brain Waste is thus a combination of brain drain for the host country and a suboptimal use of the qualifications of the foreign workers in the host country. However, in the current dynamic processes of EU-mobility, the use of this term is not justified. Current intra-EU movements are characterised by a high degree of circularity. As mentioned above, workers from the EU-8 and EU-2 leave their countries for relatively short durations of stay and also exhibit a high degree of return migration (European Commission, 2010). The stay abroad can be regarded as an investment in language abilities, networks, professional skills, and, in many cases, qualifications. On return, the host country gains from such an investment and skill transfer (Kahanec, Zaiceva and Zimmermann, 2009).

According to the World Bank (2006), a massive post-accession brain drain has not occurred. However, some sectors in the EU-8 and EU-2 states might have been negatively affected by an exodus of specialists such as in the case of Polish physicians (Frelak and Kazmierkiewicz, 2007).

3.2 Data sources and issues⁴

Before we can assess the impact of enlargement and transitional arrangements on labour mobility within the EU, we must first establish the pattern of population movements from the EU-8 and EU-2 countries to the EU-15 countries, both before and after enlargement. There are three primary data sources that we have used to establish this baseline pattern: Eurostat's Population data on population stocks by citizenship; Eurostat's Population data in International Migration Flows; Eurostat's Labour Force Statistics (LFS). We have supplemented these with information from the OECD International Migration Database in some instances.

There are some key methodological differences between the LFS and Population Statistics, which means there are likely to be some discrepancies between the sources. The LFS is based on a quarterly sample survey covering 0.2-3.3% of the population, based on a common approach across countries. The Population Statistics are based on a range of sources (administrative records, national surveys, census, migration statistics, vital statistics), and while there is a binding regulation on the collection of certain migration data on an annual basis by each member state, there is not a common methodological approach to this collection. However, the Population Statistics are more comprehensive in their coverage of the population. The rules for defining usual resident population may differ between LFS and Population statistics, and the LFS only covers persons living in private households. The timing also differs, with the Population statistics reflecting the population as of 1 January in the given year, whereas the LFS provides a quarterly or annual average.

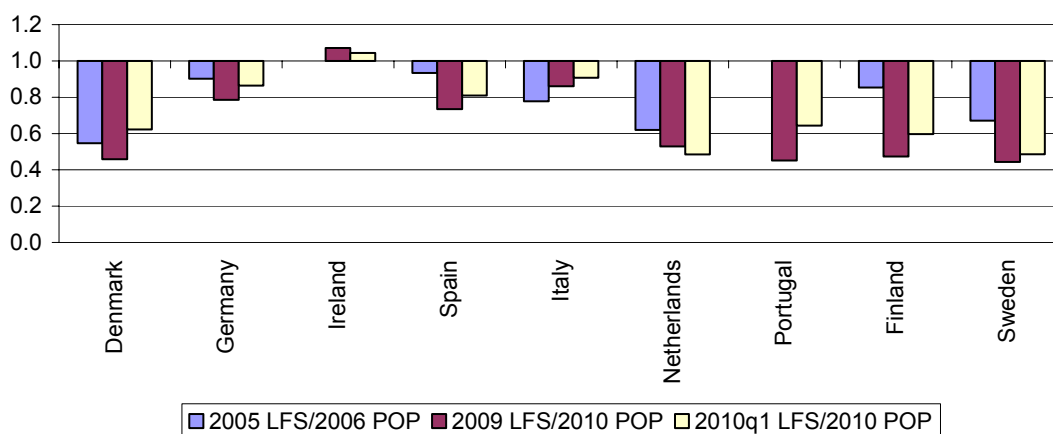
Given these potential sources for discrepancy, it is somewhat surprising to discover that the level of the population calculated for the EU-27 as a whole is only 1.2 per cent smaller in the LFS statistics compared to the Population statistics (based on 2006 figures). However, at the bilateral level within individual countries the discrepancies are far larger, and show no clear pattern over time and across countries. In figure 3.1 below we compare the stocks of population by citizenship from the EU-10 and EU-2 in a selection of EU-15 countries⁵ as reported in the LFS and the Population statistics. We compare the ratio of LFS to Population statistics estimates in 2005 (January 2006 for the Population statistics) and 2009 (January 2010 for the Population statistics). We also include figures for 2010q1 from the LFS relative to January 2010 from the Population statistics to see if this is a better fit. The columns in the figures are centred around 1, so if the series are identical no column appears, if the LFS series is smaller than the Population series the column is below the centre line and if the LFS series is higher the column rests above the centre line.

⁴ Any comments or queries related to section 3.2 of the report can be addressed to Dawn Holland (d.holland@niesr.ac.uk) or Paweł Paluchowski (p.paluchowski@niesr.ac.uk).

⁵ The selected countries were those that had near complete data sets in the relevant years in both the LFS and Population statistics.

Except in the case of Ireland, the LFS series are consistently smaller than the Population series. This is what we would expect to see given the aggregate data for the EU-27 discussed above. However, the magnitude of discrepancy is very far from what we would hope to see, averaging about 20-40 per cent smaller, compared to the 1.2 per cent discrepancy for the aggregate data. The magnitude of discrepancy shows little in the way of stability across the time periods and there is only marginal evidence that the 2010q1 LFS fit is more closely correlated with the 2010 Population statistics than the 2009 LFS figures. At the outset this tells us that the data we will be working with is subject to a high degree of uncertainty and a wide margin of error. The results that we produce based on these estimates should be viewed with this in mind.

Figure 3.1. Migrant stocks from the EU-10 and EU-2 according to LFS and Population statistics



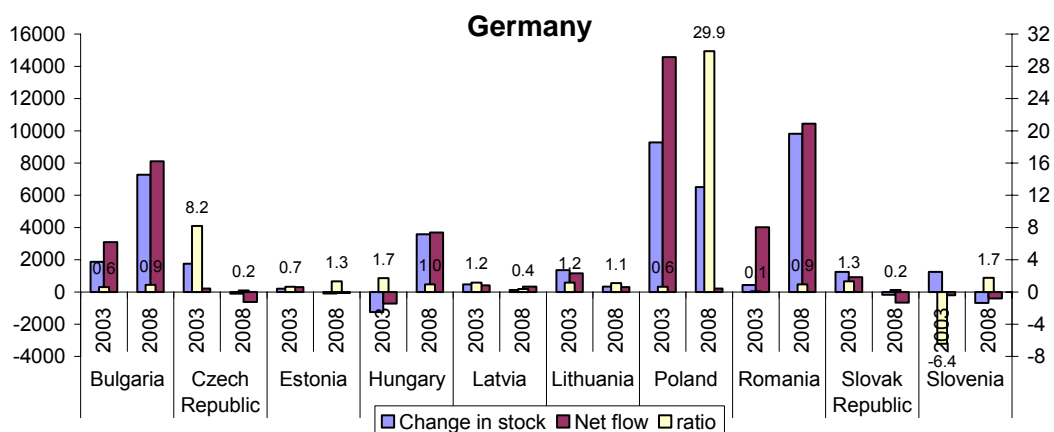
Source: Eurostat LFS and Eurostat Population statistics

We made a similar assessment of the comparability of the stock and flow data from Eurostat’s Population Statistics, to determine how closely the change in the stocks matches the net flow from the same dataset. We found a similar degree of discrepancy across these two series. Theoretically the two should not match exactly, as the change in stock includes the net birth rate (births less deaths). However, this should be a very small factor over such a short time period. Figures 3.2-3.7 below illustrate the change in stock and the net flow (inflows less outflows) in 2003 and 2008 in a selection of countries, as well as the ratio of the two. A ratio of less than 1 indicates that the flow data is larger, whereas a ratio of more than one indicates that the change in stock is larger. Both series are taken from Eurostat’s Population statistics.

The figures for Spain show a relatively high degree of consistency across the two series, with a ratio of close to 1 in many countries and time periods. However, even in Spain these figures sometimes differ by up to 40 per cent. Finland and the

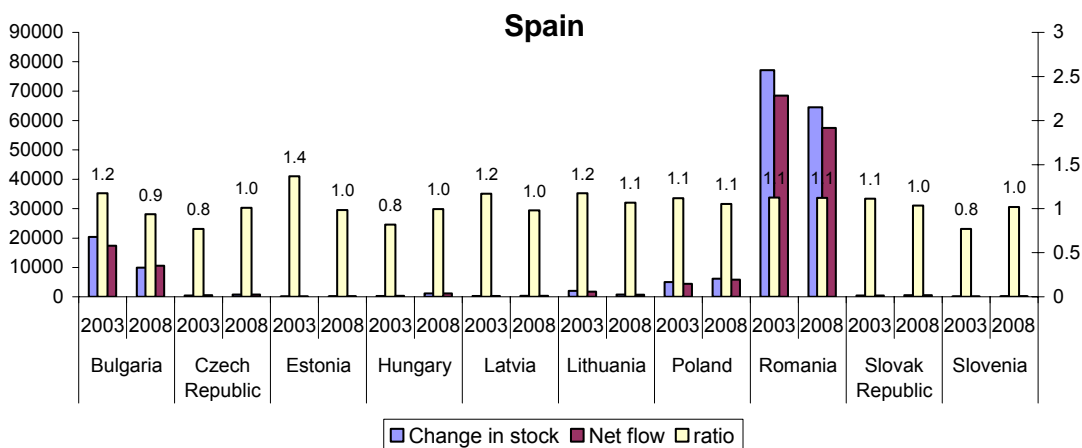
Netherlands also show a relatively consistent pattern, although in the case of the Netherlands the change in stock is always at least 20 per cent below the level of the flow. The figures for Germany and Denmark show very little consistency across the two data sources, even in the case of the two largest countries, Poland and Romania, where we might expect a higher degree of reliability in the statistics given the larger sample sizes.

Figure 3.2. Germany – change in EU-8 and EU-2 residents



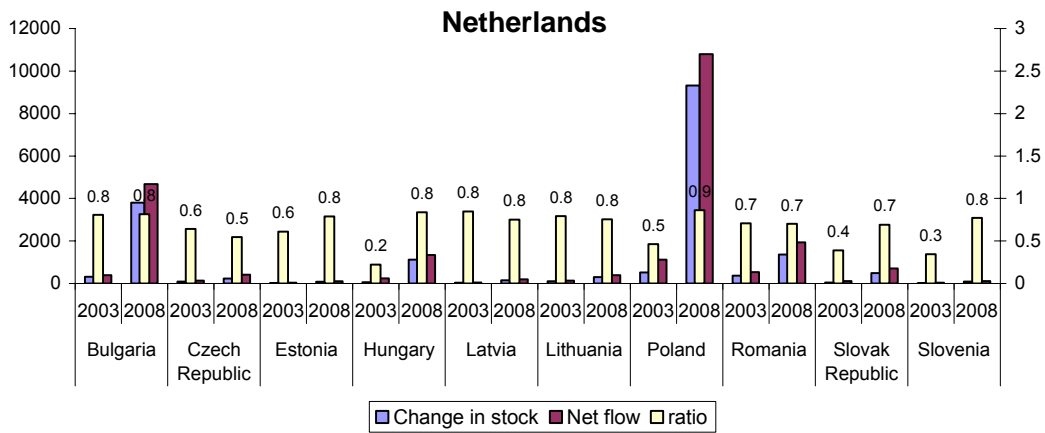
Source: Eurostat Population Statistics

Figure 3.3. Spain – change in EU-8 and EU-2 residents



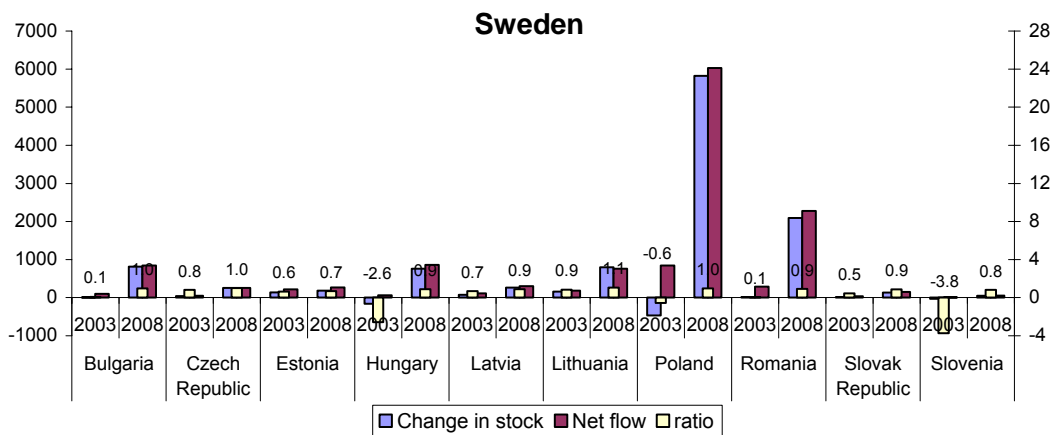
Source: Eurostat Population Statistics

Figure 3.4. Netherlands – change in EU-8 and EU-2 residents



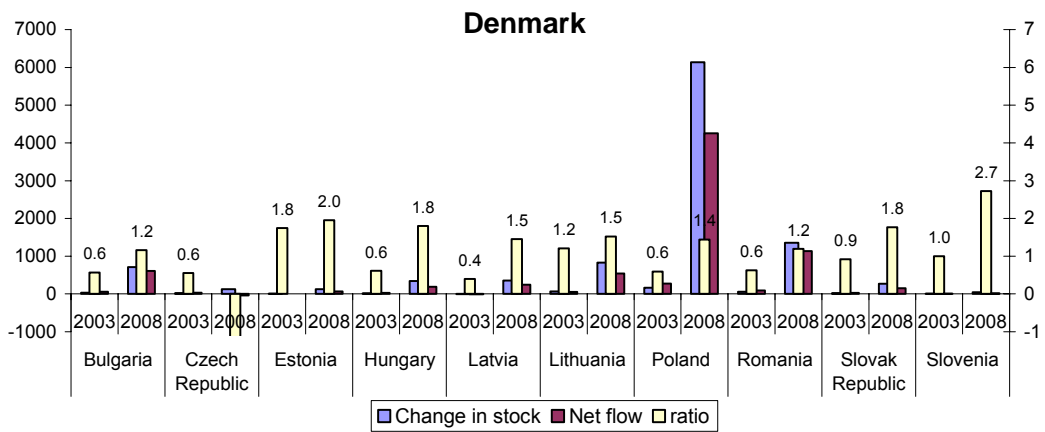
Source: Eurostat Population Statistics

Figure 3.5. Sweden – change in EU-8 and EU-2 residents



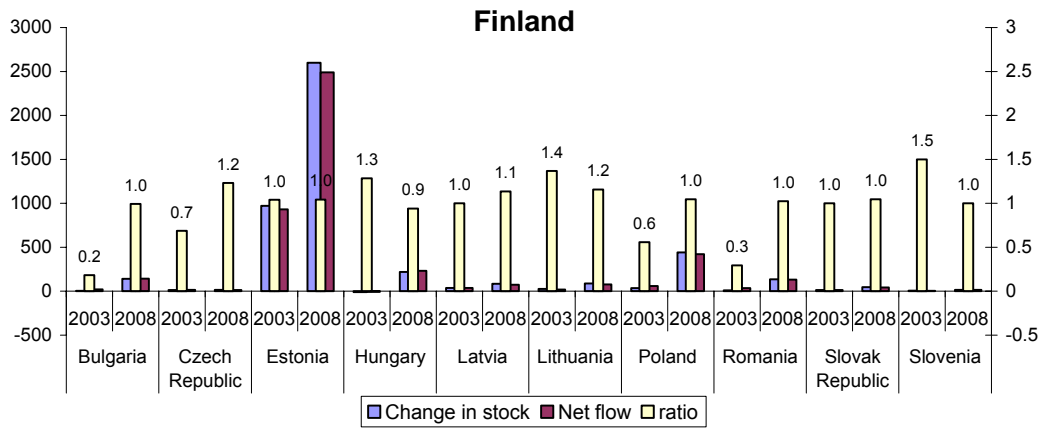
Source: Eurostat Population Statistics

Figure 3.6. Denmark – change in EU-8 and EU-2 residents



Source: Eurostat Population Statistics

Figure 3.7. Finland – change in EU-8 and EU-2 residents

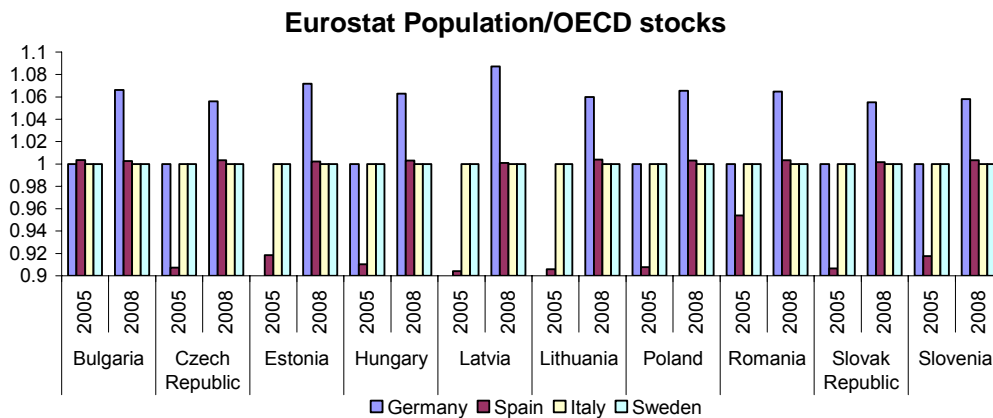


Source: Eurostat Population Statistics

The final source that we use for comparison is the OECD International Migration Database. This source is less comprehensive and less timely than the Eurostat sources, so would not be used as a primary data source. However, it does show a very strong correlation with the Eurostat Population statistics for population stocks by citizenship. Figure 3.8 below illustrates this relationship, by the ratio of Eurostat Population statistics to the relevant OECD series. In most cases (of the examples shown) the ratio is very close to one, so Eurostat and the OECD have clearly used the same source for the data⁶. The figures for Germany are somewhat higher in the Eurostat series in 2008, although the discrepancy is less than 8 per cent, which in the current context is very close. This may reflect the timeliness of the series, with the 2008 figures recently revised by Eurostat. The figures for Spain in 2005 are also significantly different, but again this discrepancy is less than 10 per cent, compared to the 20-50 per cent differences seen in the other data sources.

⁶ In most cases OECD take data directly from Eurostat for the EU countries.

Figure 3.8. Eurostat/OECD population stocks of EU-8 and EU-2 nationals



Source: Eurostat Population Statistics and OECD International Migration Database

Having determined that the available data sources are not consistent, the next problem that we face is that no single source is complete, as they all contain a large number of missing values for certain countries and certain time periods. Were this not the case we could simply use the three primary data sources as alternative baseline scenarios. However, as this is not possible we need to choose a primary data source, and establish a consistent methodology for estimating the missing observations from that source.

We choose to adopt Eurostat’s Population statistics on population stocks by citizenship as our primary source. This choice is supported by the fact that this is the primary source used for the development and monitoring of harmonised immigration policies. The broader coverage makes it a better choice than the LFS, which may suffer from small sample biases. Marti and Rodenas (2007) undertake a review of the sampling procedures for the LFS in several EU countries. They highlight the fact that the sample size used is not always sufficient to capture changes in the small populations of residents from a given home country in an individual host country. They find that the LFS approach is more likely to capture population statistics in some countries than others: Austria, Belgium, France, Luxembourg, Sweden and the UK.

Our primary data source contains a complete time series from 1997 for 6 of the EU-15 countries (Denmark, Germany, Spain, Netherlands, Finland, Sweden). There is a fairly comprehensive coverage of 4 other countries (Belgium, Italy, Austria, Portugal), with sporadic information on the remaining 5 countries (Ireland, Greece, France, Luxembourg, UK). We treat the 1 January 2010 data as the year-end data for 2009. Missing observations were filled using information from the OECD International Migration Database in the first instance, as this showed a very strong correlation with the Eurostat Population statistics. This allowed us to fill most of the missing observations in 4 countries (Greece, Italy, Luxembourg, Portugal). Further missing observations were filled using information from the LFS (primarily for

France and the UK). The remaining missing observations were filled by assuming either a constant growth rate between two stock values or else using the average growth rate of stocks from the host country to the other EU-15 host countries for which data was available. In general, values of 0 were treated as missing values.

This allows us to establish a complete annual matrix of population stocks from home country *i* (EU-8 and EU-2) to host country *j* (EU-15) for the period 1997-2009. We approximate the net bilateral flows by the change in these stock values. Table 3.2 below reports our full bilateral population stock matrix.

We also report a smaller matrix for population stocks of EU-2 citizens in each of the EU-10 countries, since 2003. There is very limited data availability for some countries (and none for Estonia). The magnitude of EU-2 citizens moving to EU-10 countries since 2004 is small, amounting to just 0.1 per cent of the populations of Bulgaria and Romania. Of the total stock of EU-2 citizens living in the EU-10, as of 2009 about 80 per cent of Romanians reside in Hungary, and nearly 50 per cent of Bulgarians reside in Cyprus. The inflows into most EU-10 countries since 2003 have also been 0.1 per cent of the domestic population or less, except in the case of Cyprus, where the population stocks of Romanian and Bulgarian citizens has risen by nearly 2 per cent of the Cypriot population.

Table 3.2. Population stocks by citizenship in EU-15 countries
 Labour mobility within the EU
 The impact of enlargement and the functioning of the transitional arrangements
 FINAL REPORT

| CITIZEN | TIME | Belgium | Denmark | Germany | Ireland | Greece | Spain | France | Italy | Lux | Neths | Austria | Portugal | Finland | Sweden | UK | EU-15 |
|------------|------|---------|---------|---------|---------|--------|-------|--------|-------|------|-------|---------|----------|---------|--------|-------|--------|
| Czech Rep. | 1997 | 476 | 133 | 19583 | 713 | 712 | 637 | 1119 | 2948 | 76 | 855 | 6325 | 87 | 118 | 267 | 8045 | 42095 |
| Czech Rep. | 1998 | 505 | 163 | 20782 | 756 | 536 | 666 | 1185 | 3122 | 81 | 1005 | 6699 | 87 | 138 | 331 | 7738 | 43794 |
| Czech Rep. | 1999 | 536 | 197 | 22038 | 803 | 607 | 920 | 1259 | 3429 | 86 | 1014 | 6929 | 96 | 155 | 371 | 6758 | 45197 |
| Czech Rep. | 2000 | 597 | 225 | 24361 | 894 | 677 | 1447 | 1402 | 3674 | 97 | 1174 | 7313 | 217 | 174 | 433 | 7596 | 50281 |
| Czech Rep. | 2001 | 731 | 254 | 26667 | 981 | 850 | 1910 | 1539 | 3669 | 111 | 1382 | 6231 | 113 | 187 | 471 | 14843 | 59940 |
| Czech Rep. | 2002 | 885 | 279 | 28429 | 1080 | 1957 | 2576 | 1694 | 3081 | 92 | 1434 | 6597 | 119 | 187 | 527 | 21177 | 70114 |
| Czech Rep. | 2003 | 1435 | 298 | 30186 | 1189 | 1353 | 2970 | 4821 | 3814 | 158 | 1525 | 6896 | 143 | 198 | 566 | 17738 | 73290 |
| Czech Rep. | 2004 | 3509 | 368 | 30301 | 924 | 849 | 3782 | 2750 | 4328 | 247 | 1776 | 7360 | 166 | 196 | 581 | 6651 | 63789 |
| Czech Rep. | 2005 | 1952 | 507 | 31983 | 2905 | 1047 | 4682 | 4145 | 4709 | 408 | 1937 | 7733 | 190 | 201 | 609 | 7628 | 70635 |
| Czech Rep. | 2006 | 2102 | 487 | 35382 | 5110 | 1039 | 6570 | 2729 | 4905 | 506 | 2057 | 7986 | 213 | 244 | 715 | 25563 | 95608 |
| Czech Rep. | 2007 | 2086 | 566 | 36418 | 6524 | 1163 | 7999 | 4568 | 5499 | 571 | 2290 | 8287 | 313 | 268 | 845 | 35540 | 112937 |
| Czech Rep. | 2008 | 2368 | 691 | 36312 | 7938 | 794 | 8767 | 5405 | 5801 | 645 | 2519 | 9078 | 203 | 284 | 1102 | 29055 | 110962 |
| Czech Rep. | 2009 | 2820 | 709 | 36378 | 7431 | 1312 | 9082 | 2228 | 6009 | 223 | 2602 | 5446 | 223 | 312 | 1212 | 28260 | 104248 |
| Estonia | 1997 | 68 | 384 | 3173 | 1633 | 39 | 22 | 171 | 191 | 17 | 100 | 40 | 1 | 9689 | 1124 | 830 | 17482 |
| Estonia | 1998 | 72 | 411 | 3348 | 1740 | 44 | 33 | 182 | 204 | 18 | 100 | 43 | 1 | 10340 | 1216 | 884 | 18636 |
| Estonia | 1999 | 75 | 395 | 3429 | 1800 | 49 | 55 | 188 | 226 | 18 | 111 | 47 | 1 | 10652 | 1350 | 914 | 19310 |
| Estonia | 2000 | 78 | 458 | 3649 | 1878 | 54 | 89 | 197 | 250 | 19 | 121 | 54 | 11 | 10839 | 1554 | 954 | 20205 |
| Estonia | 2001 | 88 | 503 | 3880 | 2018 | 63 | 176 | 211 | 305 | 26 | 147 | 58 | 9 | 11662 | 1662 | 1563 | 22371 |
| Estonia | 2002 | 119 | 534 | 4019 | 2139 | 73 | 317 | 224 | 266 | 23 | 165 | 74 | 15 | 12428 | 1768 | 2171 | 24335 |
| Estonia | 2003 | 403 | 541 | 4220 | 2291 | 82 | 421 | 309 | 383 | 61 | 187 | 96 | 24 | 13397 | 1906 | 2780 | 27101 |
| Estonia | 2004 | 467 | 539 | 3775 | 2656 | 95 | 563 | 394 | 482 | 124 | 284 | 129 | 33 | 13978 | 2155 | 3577 | 29252 |
| Estonia | 2005 | 635 | 611 | 3907 | 3614 | 129 | 720 | 485 | 555 | 256 | 318 | 158 | 42 | 15459 | 2371 | 4618 | 33878 |
| Estonia | 2006 | 550 | 682 | 4277 | 2840 | 86 | 1008 | 576 | 630 | 310 | 321 | 171 | 51 | 17599 | 2588 | 5346 | 37035 |
| Estonia | 2007 | 586 | 807 | 4382 | 4817 | 142 | 1176 | 666 | 734 | 340 | 365 | 194 | 86 | 20006 | 2809 | 7681 | 44791 |
| Estonia | 2008 | 776 | 934 | 4290 | 4082 | 118 | 1355 | 757 | 838 | 390 | 444 | 236 | 79 | 22604 | 2994 | 3667 | 43565 |
| Estonia | 2009 | 1186 | 958 | 4422 | 3861 | 163 | 1478 | 848 | 928 | 372 | 547 | 640 | 111 | 25510 | 3389 | 14100 | 58513 |
| Hungary | 1997 | 966 | 366 | 52029 | 576 | 609 | 298 | 2740 | 3608 | 50 | 1275 | 11536 | 96 | 454 | 2925 | 6580 | 84107 |
| Hungary | 1998 | 1022 | 377 | 51905 | 578 | 789 | 412 | 2754 | 3625 | 50 | 1400 | 11591 | 97 | 508 | 2954 | 5879 | 83941 |
| Hungary | 1999 | 1089 | 406 | 53152 | 590 | 593 | 540 | 2811 | 3690 | 111 | 1385 | 12140 | 112 | 597 | 2992 | 7133 | 87341 |
| Hungary | 2000 | 1534 | 391 | 54437 | 604 | 399 | 778 | 2874 | 3760 | 143 | 1538 | 12729 | 158 | 654 | 2988 | 4273 | 87260 |
| Hungary | 2001 | 1629 | 445 | 55978 | 619 | 411 | 1060 | 2948 | 3616 | 183 | 1719 | 13069 | 136 | 708 | 2727 | 7258 | 92506 |
| Hungary | 2002 | 1564 | 447 | 55953 | 622 | 860 | 1457 | 2961 | 2920 | 153 | 1832 | 13684 | 161 | 687 | 2463 | 6599 | 92363 |
| Hungary | 2003 | 2022 | 463 | 54714 | 604 | 414 | 1724 | 2958 | 3446 | 202 | 1886 | 14151 | 184 | 678 | 2303 | 6021 | 91769 |
| Hungary | 2004 | 1754 | 527 | 47808 | 525 | 1359 | 2298 | 2954 | 3734 | 293 | 2029 | 15133 | 206 | 634 | 2309 | 5157 | 86720 |
| Hungary | 2005 | 2397 | 624 | 49472 | 717 | 789 | 3044 | 4243 | 4051 | 480 | 2271 | 16284 | 229 | 687 | 2349 | 4009 | 91645 |
| Hungary | 2006 | 2140 | 724 | 56075 | 2357 | 425 | 4704 | 4018 | 4389 | 597 | 2386 | 17428 | 251 | 724 | 2560 | 9166 | 107944 |
| Hungary | 2007 | 2917 | 1019 | 60221 | 4581 | 124 | 6628 | 3793 | 5467 | 688 | 2921 | 19318 | 386 | 900 | 3104 | 18157 | 130224 |
| Hungary | 2008 | 2577 | 1357 | 63801 | 5884 | 2176 | 7791 | 3568 | 6171 | 756 | 4044 | 21527 | 333 | 1117 | 3862 | 21918 | 146881 |
| Hungary | 2009 | 3122 | 1586 | 65443 | 5543 | 2724 | 8365 | 5844 | 6868 | 1679 | 5294 | 19653 | 352 | 1198 | 4525 | 19308 | 151503 |

| Labour mobility within the EU | | Belgium | Denmark | Germany | Ireland | Greece | Spain | France | Italy | Lux | Neths | Austria | Portugal | Finland | Sweden | UK | EU-15 |
|-------------------------------|------|--------------------------------------------------------------------------------|---------|---------|---------|--------|-------|--------|--------|------|-------|---------|----------|---------|--------|--------|---------|
| CITIZEN TIME | | The impact of enlargement and the functioning of the transitional arrangements | | | | | | | | | | | | | | | |
| FINAL REPORT | 1997 | | | | | | | | | | | | | | | | |
| Latvia | 1998 | 96 | 449 | 6147 | 1134 | 71 | 32 | 215 | 234 | 2 | 110 | 82 | 3 | 134 | 387 | 959 | 10055 |
| Latvia | 1999 | 108 | 509 | 6853 | 1278 | 60 | 41 | 243 | 264 | 2 | 140 | 92 | 2 | 175 | 489 | 1514 | 11770 |
| Latvia | 2000 | 118 | 558 | 7446 | 1396 | 48 | 70 | 265 | 333 | 9 | 146 | 100 | 7 | 201 | 582 | 1654 | 12934 |
| Latvia | 2001 | 129 | 742 | 7915 | 1522 | 37 | 178 | 289 | 426 | 8 | 173 | 152 | 10 | 227 | 694 | 1803 | 14305 |
| Latvia | 2002 | 169 | 860 | 8543 | 1674 | 116 | 417 | 318 | 566 | 9 | 188 | 173 | 12 | 276 | 780 | 1840 | 15941 |
| Latvia | 2003 | 195 | 909 | 8866 | 1769 | 195 | 698 | 336 | 484 | 10 | 244 | 228 | 17 | 300 | 858 | 2887 | 17996 |
| Latvia | 2004 | 222 | 905 | 9341 | 2406 | 274 | 994 | 493 | 690 | 39 | 283 | 272 | 38 | 338 | 934 | 4945 | 22174 |
| Latvia | 2005 | 255 | 942 | 8844 | 2760 | 353 | 1246 | 650 | 862 | 131 | 361 | 342 | 60 | 392 | 1072 | 4429 | 22698 |
| Latvia | 2006 | 682 | 1085 | 9477 | 7393 | 945 | 1565 | 392 | 1085 | 229 | 450 | 359 | 81 | 473 | 1217 | 5729 | 31163 |
| Latvia | 2007 | 707 | 1261 | 10684 | 13183 | 1474 | 2183 | 399 | 1286 | 265 | 491 | 370 | 102 | 515 | 1470 | 16526 | 50916 |
| Latvia | 2008 | 687 | 1531 | 10724 | 19394 | 1257 | 2533 | 405 | 1559 | 304 | 564 | 400 | 193 | 593 | 1677 | 15263 | 57084 |
| Latvia | 2009 | 975 | 1885 | 10851 | 25604 | 1785 | 2870 | 412 | 1782 | 347 | 713 | 461 | 240 | 677 | 1943 | 23924 | 74469 |
| Latvia | 2009 | 1204 | 2521 | 12699 | 24264 | 1539 | 3399 | 418 | 2020 | 93 | 1143 | 590 | 311 | 802 | 2781 | 25976 | 79760 |
| Lithuania | 1997 | 115 | 555 | 6631 | 1037 | 112 | 65 | 297 | 339 | 10 | 260 | 152 | 11 | 163 | 358 | 7794 | 17899 |
| Lithuania | 1998 | 128 | 731 | 7240 | 1156 | 115 | 77 | 331 | 378 | 11 | 325 | 169 | 11 | 180 | 413 | 7934 | 19199 |
| Lithuania | 1999 | 142 | 884 | 8042 | 1290 | 118 | 149 | 369 | 450 | 9 | 338 | 179 | 14 | 194 | 469 | 7863 | 20511 |
| Lithuania | 2000 | 169 | 1221 | 9442 | 1531 | 121 | 1565 | 438 | 526 | 14 | 346 | 208 | 29 | 204 | 574 | 7936 | 24324 |
| Lithuania | 2001 | 192 | 1496 | 11156 | 1818 | 140 | 3913 | 520 | 700 | 18 | 393 | 208 | 18 | 245 | 727 | 7909 | 29453 |
| Lithuania | 2002 | 250 | 1616 | 12635 | 2071 | 160 | 6548 | 593 | 485 | 20 | 487 | 237 | 22 | 288 | 943 | 15239 | 41594 |
| Lithuania | 2003 | 377 | 1681 | 13985 | 5089 | 179 | 8546 | 914 | 864 | 52 | 595 | 282 | 75 | 314 | 1102 | 15315 | 49369 |
| Lithuania | 2004 | 294 | 1946 | 14713 | 3967 | 198 | 11389 | 1234 | 1278 | 111 | 970 | 383 | 127 | 351 | 1451 | 26115 | 64527 |
| Lithuania | 2005 | 941 | 2372 | 17357 | 12717 | 103 | 14332 | 745 | 1735 | 226 | 1175 | 493 | 180 | 398 | 2071 | 43611 | 98456 |
| Lithuania | 2006 | 936 | 2945 | 20307 | 24434 | 87 | 18946 | 851 | 2184 | 280 | 1262 | 530 | 232 | 466 | 2821 | 66588 | 142868 |
| Lithuania | 2007 | 1005 | 3489 | 21165 | 35201 | 69 | 21234 | 1042 | 3006 | 337 | 1447 | 589 | 430 | 527 | 3613 | 73174 | 166327 |
| Lithuania | 2008 | 1799 | 4315 | 21499 | 45967 | 51 | 22013 | 1033 | 3640 | 397 | 1743 | 651 | 505 | 615 | 4408 | 91191 | 199828 |
| Lithuania | 2009 | 1563 | 5234 | 22812 | 43492 | 315 | 22075 | 1836 | 4141 | 250 | 2126 | 960 | 558 | 655 | 5484 | 80785 | 192285 |
| Poland | 1997 | 6034 | 5457 | 283312 | 1845 | 5246 | 5496 | 29783 | 23584 | 635 | 5680 | 21447 | 190 | 684 | 15842 | 40910 | 446145 |
| Poland | 1998 | 6319 | 5508 | 283604 | 1819 | 208 | 5685 | 29371 | 23258 | 626 | 5905 | 21151 | 190 | 698 | 15925 | 39660 | 439927 |
| Poland | 1999 | 6749 | 5571 | 291673 | 1906 | 6744 | 7245 | 30770 | 29478 | 643 | 5645 | 21394 | 205 | 718 | 16345 | 39055 | 464141 |
| Poland | 2000 | 7800 | 5548 | 301366 | 1988 | 10431 | 11448 | 32100 | 30419 | 666 | 5944 | 21841 | 382 | 694 | 16667 | 38340 | 485635 |
| Poland | 2001 | 9633 | 5735 | 310432 | 2042 | 11182 | 14849 | 32960 | 32889 | 707 | 6312 | 21433 | 249 | 743 | 15511 | 41441 | 506117 |
| Poland | 2002 | 11022 | 5689 | 317603 | 2091 | 13510 | 20458 | 33758 | 29972 | 715 | 6912 | 21750 | 284 | 768 | 13878 | 43225 | 521635 |
| Poland | 2003 | 12238 | 5854 | 326882 | 8954 | 14112 | 25453 | 23578 | 40314 | 828 | 7431 | 22249 | 353 | 802 | 13412 | 76748 | 579208 |
| Poland | 2004 | 26884 | 6199 | 292109 | 10333 | 15932 | 32843 | 36643 | 50794 | 1012 | 10968 | 26554 | 422 | 810 | 14664 | 109994 | 636160 |
| Poland | 2005 | 43134 | 7353 | 326596 | 13606 | 17007 | 41572 | 23967 | 60823 | 1313 | 15202 | 30580 | 490 | 899 | 17172 | 175981 | 775696 |
| Poland | 2006 | 37948 | 9701 | 387958 | 62674 | 16146 | 62910 | 34393 | 72457 | 1576 | 19645 | 33319 | 559 | 1083 | 22410 | 283270 | 1046049 |
| Poland | 2007 | 30768 | 13753 | 413044 | 75763 | 16627 | 78928 | 27513 | 90218 | 1834 | 26189 | 35485 | 913 | 1446 | 28909 | 486661 | 1328051 |
| Poland | 2008 | 37919 | 19890 | 419555 | 88851 | 21420 | 85075 | 36184 | 99389 | 2213 | 35499 | 36879 | 925 | 1888 | 34733 | 575346 | 1495766 |
| Poland | 2009 | 36996 | 21119 | 425608 | 83012 | 14998 | 85513 | 34156 | 105608 | 4146 | 43083 | 38849 | 1042 | 2078 | 38587 | 561515 | 1496311 |

| Labour mobility within the EU | | Belgium | Denmark | Germany | Ireland | Greece | Spain | France | Italy | Lux | Neths | Austria | Portugal | Finland | Sweden | UK | EU-15 |
|--------------------------------------------------------------------------------|------|---------|---------|---------|---------|--------|--------|--------|--------|------|-------|---------|----------|---------|--------|--------|---------|
| The impact of enlargement and the functioning of the transitional arrangements | | | | | | | | | | | | | | | | | |
| CITIZEN | TIME | | | | | | | | | | | | | | | | |
| FINAL REPORT | | | | | | | | | | | | | | | | | |
| Slovak Rep. | 1997 | 260 | 51 | 9242 | 2996 | 361 | 148 | 591 | 1784 | 66 | 355 | 6182 | 8 | 21 | 228 | 2594 | 24887 |
| Slovak Rep. | 1998 | 279 | 65 | 9808 | 3213 | 351 | 184 | 633 | 1913 | 71 | 485 | 6628 | 8 | 27 | 263 | 2314 | 26242 |
| Slovak Rep. | 1999 | 341 | 111 | 12097 | 3929 | 342 | 303 | 775 | 2087 | 73 | 579 | 7136 | 9 | 40 | 284 | 8448 | 36553 |
| Slovak Rep. | 2000 | 412 | 127 | 14657 | 4745 | 332 | 739 | 935 | 2414 | 74 | 719 | 7739 | 22 | 51 | 349 | 5459 | 38774 |
| Slovak Rep. | 2001 | 556 | 127 | 17049 | 5494 | 286 | 1159 | 1083 | 2972 | 76 | 915 | 7508 | 14 | 71 | 363 | 4238 | 41911 |
| Slovak Rep. | 2002 | 824 | 140 | 18327 | 5879 | 240 | 1778 | 1159 | 2087 | 81 | 940 | 8516 | 15 | 82 | 400 | 10891 | 51359 |
| Slovak Rep. | 2003 | 1195 | 164 | 19567 | 6259 | 194 | 2253 | 3100 | 3092 | 129 | 983 | 9484 | 28 | 94 | 415 | 18455 | 65412 |
| Slovak Rep. | 2004 | 1566 | 184 | 20244 | 1817 | 148 | 3188 | 1959 | 3895 | 209 | 1239 | 11322 | 41 | 90 | 505 | 24289 | 70696 |
| Slovak Rep. | 2005 | 2538 | 303 | 21685 | 5450 | 249 | 4093 | 2801 | 4345 | 323 | 1560 | 12982 | 53 | 128 | 559 | 41665 | 98735 |
| Slovak Rep. | 2006 | 2336 | 301 | 25309 | 8046 | 350 | 6050 | 3763 | 5416 | 391 | 1876 | 14223 | 66 | 145 | 656 | 41607 | 110535 |
| Slovak Rep. | 2007 | 3001 | 507 | 25987 | 9589 | 180 | 7418 | 2677 | 7463 | 460 | 2178 | 15665 | 187 | 173 | 781 | 73844 | 150110 |
| Slovak Rep. | 2008 | 4404 | 777 | 25823 | 11132 | 264 | 7980 | 1591 | 8091 | 512 | 2666 | 18065 | 173 | 219 | 914 | 60926 | 143537 |
| Slovak Rep. | 2009 | 3736 | 848 | 26419 | 10379 | 126 | 8058 | 2303 | 8675 | 1643 | 2844 | 16605 | 197 | 248 | 1047 | 82320 | 165448 |
| Slovenia | 1997 | 213 | 32 | 18093 | 56 | 29 | 56 | 686 | 3386 | 53 | 110 | 6875 | 6 | 5 | 516 | 538 | 30654 |
| Slovenia | 1998 | 218 | 35 | 18412 | 58 | 99 | 52 | 705 | 3476 | 54 | 150 | 7058 | 6 | 7 | 581 | 552 | 31463 |
| Slovenia | 1999 | 222 | 40 | 18648 | 59 | 169 | 92 | 717 | 3720 | 56 | 144 | 6945 | 8 | 8 | 600 | 562 | 31989 |
| Slovenia | 2000 | 225 | 51 | 18766 | 59 | 239 | 152 | 726 | 3716 | 58 | 165 | 6893 | 18 | 10 | 625 | 569 | 32272 |
| Slovenia | 2001 | 215 | 50 | 19395 | 61 | 138 | 188 | 746 | 3751 | 56 | 193 | 6267 | 13 | 10 | 627 | 585 | 32295 |
| Slovenia | 2002 | 212 | 50 | 20550 | 64 | 128 | 244 | 786 | 2136 | 62 | 225 | 6215 | 17 | 11 | 539 | 616 | 31855 |
| Slovenia | 2003 | 141 | 57 | 21795 | 68 | 117 | 311 | 788 | 2990 | 105 | 235 | 6192 | 22 | 17 | 509 | 651 | 33998 |
| Slovenia | 2004 | 131 | 57 | 21034 | 63 | 99 | 426 | 789 | 2382 | 151 | 256 | 6452 | 28 | 17 | 520 | 605 | 33009 |
| Slovenia | 2005 | 745 | 78 | 21195 | 359 | 349 | 568 | 1073 | 2516 | 253 | 299 | 6554 | 33 | 21 | 529 | 649 | 35221 |
| Slovenia | 2006 | 528 | 102 | 22452 | 129 | 208 | 819 | 1052 | 2948 | 292 | 356 | 6679 | 38 | 25 | 537 | 505 | 36670 |
| Slovenia | 2007 | 559 | 135 | 22336 | 188 | 67 | 1055 | 1032 | 3096 | 334 | 411 | 6973 | 57 | 44 | 574 | 1267 | 38128 |
| Slovenia | 2008 | 399 | 184 | 21652 | 247 | 180 | 1217 | 1368 | 3101 | 359 | 503 | 7187 | 44 | 60 | 619 | 554 | 37674 |
| Slovenia | 2009 | 451 | 204 | 21279 | 233 | 519 | 1267 | 1705 | 3057 | 132 | 562 | 7886 | 49 | 74 | 644 | 2472 | 40533 |
| EU-8 | 1997 | 8228 | 7427 | 398210 | 9991 | 7179 | 6754 | 35603 | 36075 | 908 | 8745 | 52639 | 402 | 11268 | 21647 | 68250 | 673324 |
| EU-8 | 1998 | 8651 | 7799 | 401952 | 10598 | 2202 | 7150 | 35404 | 36240 | 913 | 9510 | 53431 | 402 | 12073 | 22172 | 66475 | 674972 |
| EU-8 | 1999 | 9273 | 8162 | 416525 | 11772 | 8670 | 9374 | 37154 | 43413 | 1005 | 9362 | 54870 | 452 | 12565 | 22993 | 72387 | 717976 |
| EU-8 | 2000 | 10944 | 8763 | 434593 | 13221 | 12290 | 16396 | 38962 | 45185 | 1079 | 10180 | 56929 | 847 | 12853 | 23884 | 66930 | 753056 |
| EU-8 | 2001 | 13213 | 9470 | 453100 | 14707 | 13187 | 23672 | 40326 | 48468 | 1186 | 11249 | 54947 | 564 | 13902 | 22868 | 79676 | 800534 |
| EU-8 | 2002 | 15071 | 9664 | 466382 | 15715 | 17122 | 34076 | 41511 | 41431 | 1156 | 12239 | 57301 | 650 | 14751 | 21376 | 102805 | 851250 |
| EU-8 | 2003 | 18033 | 9963 | 480690 | 26861 | 16725 | 42672 | 36960 | 55593 | 1574 | 13125 | 59622 | 866 | 15838 | 21147 | 142653 | 942321 |
| EU-8 | 2004 | 34860 | 10762 | 438828 | 23046 | 19033 | 55735 | 47373 | 67755 | 2278 | 17883 | 67675 | 1081 | 16468 | 23257 | 180817 | 1006851 |
| EU-8 | 2005 | 53024 | 12933 | 481672 | 46762 | 20619 | 70576 | 37851 | 79819 | 3488 | 23212 | 75143 | 1297 | 18266 | 26877 | 283890 | 1235429 |
| EU-8 | 2006 | 47247 | 16203 | 562444 | 118773 | 19815 | 103190 | 47780 | 94215 | 4217 | 28394 | 80706 | 1512 | 20801 | 33757 | 448571 | 1627625 |
| EU-8 | 2007 | 41609 | 21807 | 594277 | 156055 | 19629 | 126971 | 41695 | 117042 | 4868 | 36365 | 86911 | 2565 | 23957 | 42312 | 711587 | 2027651 |
| EU-8 | 2008 | 51218 | 30033 | 603783 | 189705 | 26788 | 137068 | 50317 | 128813 | 5619 | 48131 | 94084 | 2502 | 27464 | 50575 | 806581 | 2252681 |
| EU-8 | 2009 | 51078 | 33179 | 615060 | 178215 | 21696 | 139237 | 49337 | 137306 | 8538 | 58201 | 90629 | 2843 | 30877 | 57669 | 814736 | 2288600 |

| Labour mobility within the EU The impact of enlargement and the functioning of the transitional arrangements FINAL REPORT | CITIZEN | TIME | Belgium | Denmark | Germany | Ireland | Greece | Spain | France | Italy | Lux | Neths | Austria | Portugal | Finland | Sweden | UK | EU-15 |
|---------------------------------------------------------------------------------------------------------------------------------|----------|-------|---------|---------|---------|---------|--------|-------|--------|-------|-------|-------|---------|----------|---------|--------|---------|-------|
| | Bulgaria | 1997 | 799 | 341 | 34463 | 479 | 7043 | 1673 | 2209 | 5696 | 100 | 535 | 3868 | 318 | 320 | 1331 | 7346 | 66522 |
| Bulgaria | 1998 | 846 | 357 | 31564 | 443 | 6742 | 1583 | 2047 | 5278 | 93 | 630 | 3584 | 296 | 333 | 1171 | 8225 | 63192 | |
| Bulgaria | 1999 | 929 | 394 | 32290 | 454 | 6968 | 2685 | 2095 | 7378 | 107 | 713 | 3892 | 321 | 317 | 1065 | 8472 | 68080 | |
| Bulgaria | 2000 | 1069 | 408 | 34359 | 490 | 8093 | 10188 | 2260 | 7500 | 113 | 870 | 4217 | 348 | 297 | 1002 | 7258 | 78472 | |
| Bulgaria | 2001 | 1529 | 426 | 38143 | 599 | 12552 | 23468 | 2766 | 8375 | 138 | 1074 | 4690 | 2213 | 308 | 805 | 6468 | 103554 | |
| Bulgaria | 2002 | 1907 | 460 | 42419 | 728 | 18591 | 43418 | 3360 | 7324 | 116 | 1360 | 5335 | 3503 | 326 | 796 | 5328 | 134971 | |
| Bulgaria | 2003 | 2233 | 493 | 44300 | 743 | 17278 | 63814 | 6021 | 11467 | 132 | 1678 | 5856 | 4004 | 330 | 805 | 11903 | 171057 | |
| Bulgaria | 2004 | 2672 | 536 | 39167 | 1031 | 25296 | 83418 | 7089 | 15374 | 136 | 1924 | 6284 | 3837 | 329 | 810 | 12195 | 200098 | |
| Bulgaria | 2005 | 3311 | 572 | 39153 | 1652 | 27942 | 101975 | 6864 | 17746 | 204 | 2076 | 6480 | 3264 | 342 | 834 | 16012 | 228427 | |
| Bulgaria | 2006 | 3944 | 583 | 41947 | 1295 | 29518 | 124973 | 9632 | 19924 | 265 | 2202 | 6419 | 3575 | 357 | 828 | 22452 | 267914 | |
| Bulgaria | 2007 | 6753 | 823 | 50282 | 877 | 30670 | 154886 | 16483 | 33477 | 446 | 6378 | 7636 | 5076 | 477 | 1838 | 16214 | 332316 | |
| Bulgaria | 2008 | 9201 | 1533 | 57555 | 2100 | 40210 | 164784 | 22329 | 40880 | 580 | 10190 | 9015 | 6456 | 618 | 2655 | 47746 | 415852 | |
| Bulgaria | 2009 | 12092 | 2321 | 66238 | 1991 | 55265 | 167849 | 18120 | 46026 | 495 | 12340 | 16510 | 7202 | 721 | 3252 | 26206 | 436627 | |
| Romania | 1997 | 2150 | 1095 | 95190 | 4384 | 6078 | 2385 | 9385 | 36267 | 280 | 1145 | 17188 | 169 | 397 | 3213 | 3932 | 183259 | |
| Romania | 1998 | 2063 | 1046 | 89801 | 4083 | 4327 | 2723 | 8741 | 33777 | 261 | 1285 | 16008 | 12 | 398 | 3051 | 3974 | 171550 | |
| Romania | 1999 | 2311 | 1099 | 87504 | 4065 | 6020 | 5682 | 8701 | 61212 | 320 | 1397 | 16611 | 65 | 404 | 2981 | 5204 | 203576 | |
| Romania | 2000 | 2481 | 1106 | 90094 | 4159 | 5225 | 26779 | 8901 | 69999 | 355 | 1694 | 17470 | 202 | 489 | 2949 | 5324 | 237227 | |
| Romania | 2001 | 3198 | 1176 | 88102 | 4488 | 7208 | 53087 | 9606 | 82985 | 375 | 2094 | 17750 | 8197 | 546 | 2495 | 6184 | 287491 | |
| Romania | 2002 | 4069 | 1270 | 88679 | 4910 | 13803 | 112861 | 10510 | 95039 | 361 | 2360 | 19482 | 11162 | 547 | 2327 | 6809 | 374189 | |
| Romania | 2003 | 4674 | 1329 | 89104 | 2006 | 14602 | 189979 | 15529 | 177812 | 366 | 2735 | 20483 | 11873 | 557 | 2343 | 7481 | 540873 | |
| Romania | 2004 | 5642 | 1405 | 73365 | 2408 | 16195 | 287087 | 23638 | 248849 | 409 | 3020 | 21314 | 12310 | 580 | 2360 | 17619 | 716201 | |
| Romania | 2005 | 7592 | 1563 | 73043 | 4967 | 18948 | 388422 | 17785 | 297570 | 496 | 3006 | 21942 | 10892 | 628 | 2371 | 31919 | 881143 | |
| Romania | 2006 | 10252 | 1672 | 78452 | 7633 | 18949 | 539507 | 42701 | 342200 | 606 | 3225 | 21882 | 11877 | 732 | 2252 | 27102 | 1109042 | |
| Romania | 2007 | 15310 | 2386 | 90614 | 11553 | 25735 | 734764 | 41693 | 625278 | 887 | 4894 | 27646 | 19280 | 911 | 4442 | 34259 | 1639652 | |
| Romania | 2008 | 16365 | 3744 | 100429 | 15473 | 29456 | 799225 | 43404 | 796477 | 1098 | 6256 | 32341 | 27769 | 1045 | 6536 | 53052 | 1932670 | |
| Romania | 2009 | 21205 | 5076 | 112230 | 14651 | 36917 | 823111 | 48991 | 887763 | 943 | 7118 | 47596 | 32457 | 1170 | 7661 | 80491 | 2127380 | |
| EU-2 | 1997 | 2949 | 1436 | 129653 | 4863 | 13121 | 4058 | 11594 | 41964 | 381 | 1680 | 21056 | 487 | 717 | 4544 | 11278 | 249781 | |
| EU-2 | 1998 | 2909 | 1403 | 121365 | 4527 | 11069 | 4306 | 10787 | 39055 | 354 | 1915 | 19592 | 308 | 731 | 4222 | 12199 | 234743 | |
| EU-2 | 1999 | 3240 | 1493 | 119794 | 4519 | 12988 | 8367 | 10797 | 68590 | 427 | 2110 | 20503 | 386 | 721 | 4046 | 13676 | 271657 | |
| EU-2 | 2000 | 3550 | 1514 | 124453 | 4648 | 13318 | 36967 | 11162 | 77499 | 468 | 2564 | 21687 | 550 | 786 | 3951 | 12582 | 315699 | |
| EU-2 | 2001 | 4727 | 1602 | 126245 | 5087 | 19760 | 76555 | 12372 | 91360 | 513 | 3168 | 22440 | 10410 | 854 | 3300 | 12652 | 391045 | |
| EU-2 | 2002 | 5976 | 1730 | 131098 | 5638 | 32394 | 156279 | 13870 | 102363 | 477 | 3720 | 24817 | 14665 | 873 | 3123 | 12137 | 509160 | |
| EU-2 | 2003 | 6907 | 1822 | 133404 | 2749 | 31880 | 253793 | 21550 | 189279 | 498 | 4413 | 26339 | 15877 | 887 | 3148 | 19384 | 711930 | |
| EU-2 | 2004 | 8314 | 1941 | 112532 | 3438 | 41491 | 370505 | 30727 | 264223 | 545 | 4944 | 27598 | 16147 | 909 | 3170 | 29814 | 916298 | |
| EU-2 | 2005 | 10903 | 2135 | 112196 | 6618 | 46890 | 490397 | 24649 | 315316 | 700 | 5082 | 28422 | 14156 | 970 | 3205 | 47931 | 1109570 | |
| EU-2 | 2006 | 14196 | 2255 | 120399 | 8928 | 48467 | 664480 | 52333 | 362124 | 871 | 5427 | 28301 | 15452 | 1089 | 3080 | 49554 | 1376956 | |
| EU-2 | 2007 | 22063 | 3209 | 140896 | 12430 | 56405 | 889650 | 58176 | 658755 | 1333 | 11272 | 35282 | 24356 | 1388 | 6280 | 50473 | 1971968 | |
| EU-2 | 2008 | 25566 | 5277 | 157984 | 17573 | 69666 | 964009 | 65733 | 837357 | 1678 | 16446 | 41356 | 34225 | 1663 | 9191 | 100798 | 2348523 | |
| EU-2 | 2009 | 33296 | 7397 | 178468 | 16642 | 92182 | 990960 | 67111 | 933789 | 1438 | 19458 | 64106 | 39659 | 1891 | 10913 | 106697 | 2564008 | |

Source: See text

Table 3.3. Population stocks by citizenship in EU-10 countries

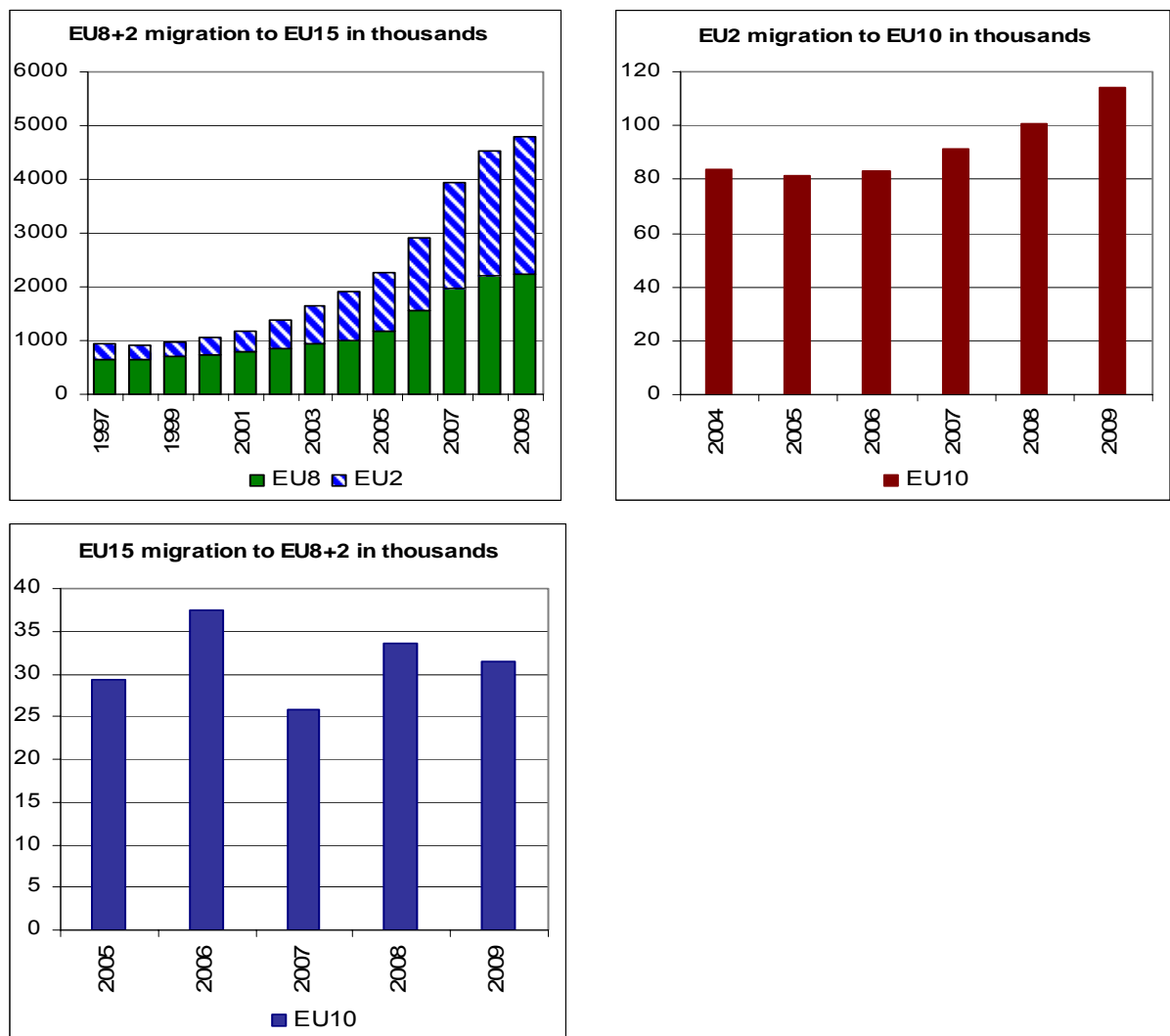
| | | Czech Republic | Estonia | Cyprus | Latvia | Lithuania | Hungary | Malta | Poland | Slovenia | Slovakia | EU-10 |
|-------------------------------------------------------------------|------|----------------|---------|-------------|-------------|-------------|-------------|-------|-------------|-------------|-------------|-------------|
| Bulgaria | 2004 | 3593 | : | 2389 | 26 | 28 | 1177 | : | 2372 | 68 | 634 | 10287 |
| Bulgaria | 2005 | 4153 | : | 2521 | 27 | 42 | 1140 | : | 996.6 | 72 | 552 | 9503 |
| Bulgaria | 2006 | 4285 | : | 3057 | 32 | 97 | 1123 | : | 1023 | 118 | 547 | 10282 |
| Bulgaria | 2007 | 5046 | : | 5260 | 328 | 123 | 1128 | 763 | 1039 | 780 | 985 | 15452 |
| Bulgaria | 2008 | 5926 | : | 7865 | 562 | 120 | 1133 | : | 1350 | 599 | 1355 | 18909 |
| Bulgaria | 2009 | 6402 | : | 10057 | 570 | : | 1211 | 157.5 | 1122 | 770 | 1515 | 21804 |
| Cumulative change 2004-2009 as % 2007 Bulgarian Population | | | | | | | | | | | | 0.15 |
| Romania | 2004 | 2445 | : | 2586 | 10 | 5 | 67608 | : | : | 131 | 417 | 73202 |
| Romania | 2005 | 2634 | : | 2231 | 10 | 4 | 66250 | : | : | 136 | 419 | 71684 |
| Romania | 2006 | 2697 | : | 2167 | 12 | 10 | 66951 | : | 228 | 166 | 700 | 72931 |
| Romania | 2007 | 3298 | : | 3012 | 76 | 13 | 65903 | 249 | 232 | 225 | 3005 | 76013 |
| Romania | 2008 | 3649 | : | 5650 | 247 | : | 66435 | : | 376 | 240 | 4966 | 81563 |
| Romania | 2009 | 4095 | : | 8954 | 301 | : | 72781 | 52 | 266 | 195 | 5424 | 92068 |
| Cumulative change 2004-2009 as % 2007 Romanian Population | | | | | | | | | | | | 0.09 |
| EU-2 | 2004 | 6038 | : | 4975 | 36 | 33 | 68785 | : | 2372 | 199 | 1051 | 83489 |
| EU-2 | 2005 | 6787 | : | 4751 | 37 | 46 | 67390 | : | 996.6 | 208 | 971 | 81187 |
| EU-2 | 2006 | 6982 | : | 5224 | 44 | 107 | 68074 | : | 1251 | 284 | 1247 | 83213 |
| EU-2 | 2007 | 8344 | : | 8272 | 404 | 136 | 67031 | 1012 | 1271 | 1005 | 3990 | 91465 |
| EU-2 | 2008 | 9575 | : | 13514 | 809 | 120 | 67568 | : | 1726 | 839 | 6321 | 100472 |
| EU-2 | 2009 | 10497 | : | 19011 | 871 | : | 73992 | 209.5 | 1388 | 965 | 6939 | 113872 |
| Cumulative change 2004-2009 as % 2007 EU-10 population | | 0.04 | : | 1.80 | 0.04 | 0.00 | 0.05 | : | 0.00 | 0.04 | 0.11 | |

Source: Eurostat population statistics

3.3 Descriptive statistics⁷

The EU enlargement has resulted in a substantial increase in labour mobility. More than 99 per cent of migration flows between the newer and older member states have been East-West migration flows from EU-8+2 to EU-15 countries. Although many EU-15 members have applied transitional restrictions on access to their labour markets by EU-8+2 migrants, the stock of EU-8+2 nationals residing in EU-15 countries tripled over the period 2003-2009, increasing from about 1.6 million in 2003 to about 4.8 million in 2009. The share of West-East migration has remained marginal, at much below 1 per cent and has not shown any monotonic trend over time. Figure 3.9 shows stocks of EU-8+2 nationals in EU-15 countries, stocks of EU-2 nationals in EU-10 countries and stocks of EU-15 nationals in EU-8+2 countries.

Figure 3.9. Intra EU migration from EU-8 and EU-2 to EU-15 and EU-10 (stocks)

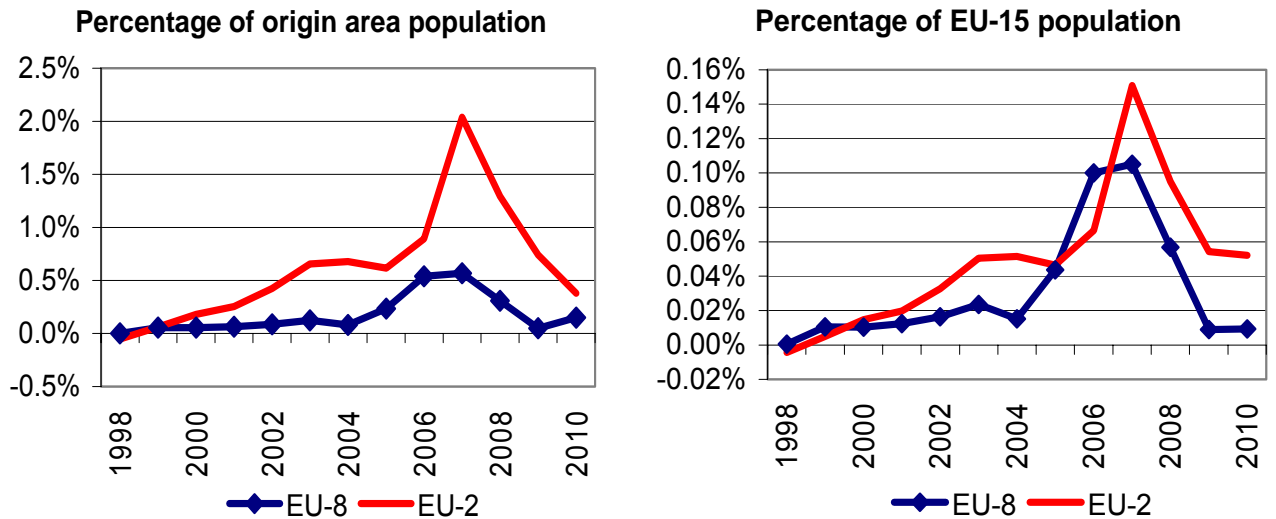


Source: Tables 3.2-3.3 and Eurostat Population Statistics

⁷ Any comments or queries related to section 3.3 of the report can be addressed to Paweł Paluchowski (p.paluchowski@niesr.ac.uk) or Tatiana Fic (t.fic@niesr.ac.uk).

Below we present the scale of EU-8 and EU-2 net migration flows to EU-15 countries relative to the populations in their home and host regions.

Figure 3.10. EU-8 and EU-2 net migration flows to EU-15



Source: Calculated from Table 3.2 and NiGEM population estimates. Figures for 2010 were estimated using Eurostat Quarterly Labour Force Statistics for 2010Q1-Q3

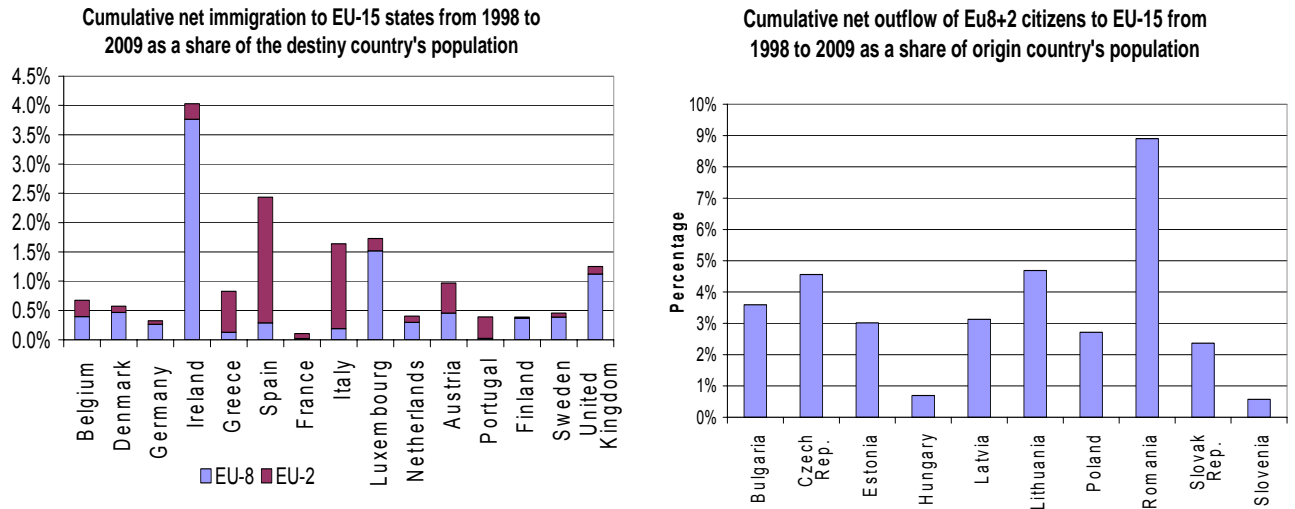
Figure 3.10 illustrates a continuous trend of net emigration with a sharp acceleration for the EU-8 after its accession in 2004, and for the EU-2 after its accession in 2007. Following the global crisis that started in mid 2007, net emigration rates from both areas dropped sharply but remained in the positive range.

The EU-2 population exhibits a higher degree of inter-EU mobility. Their net migration rates are almost continuously higher than those of the EU-8 countries. This phenomenon may be explained by the higher economic disparities between EU-2 and EU-15 countries than it is the case between EU-8 and EU-15 states. (See below for a full discussion of push and pull factors).

Figure 3.11 shows the cumulative immigration rate from the EU-8 and EU-2 to the EU-15 (as a percentage of the host country’s population) from 1998 to 2009 and the cumulative emigration rate, as a percentage of the home country’s population. Ireland had the highest relative inflow of EU-8+2 citizens over the respective time period, at over 4 per cent of its total population. Inflows to Spain, Italy, Luxembourg and the United Kingdom were also high, whereas net inflow rates in France and Germany were relatively low. The geographical allocations of immigration flows, as shown by the figures below, illustrate the different destination preferences of EU-2 and EU-8 citizens, after taking account of host country population size, which acts as a measure of the potential to absorb migration inflows. While EU-2 citizens targeted EU-15

states in the South, EU-8 citizens favoured destinations in Central and Western Europe - in particular the UK, Luxembourg and Ireland.

Figure 3.11. Cumulative net migration (1998-2009) as a share of 2009 population



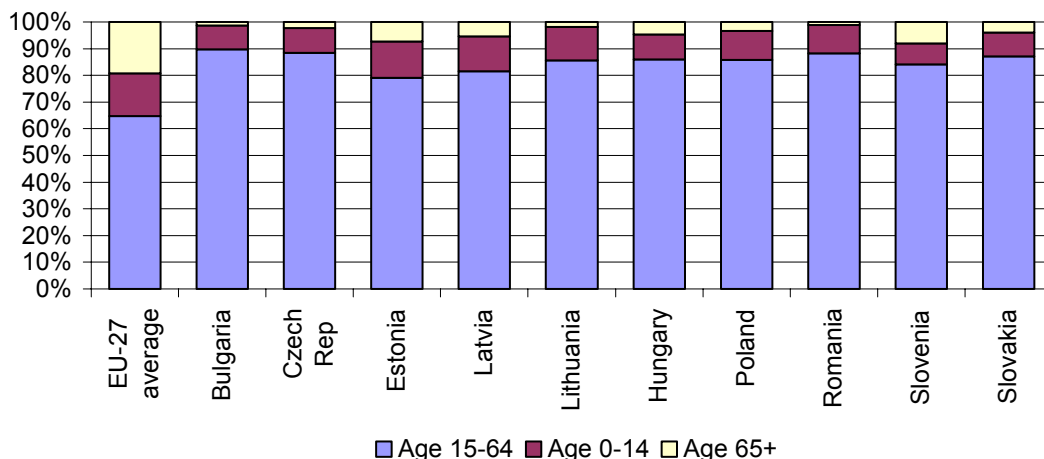
Source: Derived from Table 3.2 and Eurostat Population figures

The cumulative outflows of EU-8+2 citizens to the EU-15 have represented a sizeable human loss to the EU-8+2 countries due to their relatively small populations, as illustrated in figure 3.11. The exodus of Romanians is particularly striking - between 1998 and 2009 almost 9 per cent of the Romanian population emigrated to EU-15 countries. Whilst almost all the EU-8+2 countries experienced a cumulative net outflow of above 2 per cent of their population, the citizens of Hungary and Slovenia recorded only low net outflow rates of below one per cent. Slovenia is the wealthiest country in the EU-8+2 group, and thus the employment push-factors for migration are less urgent there than for other EU-8+2 countries. Moreover, Slovenia's proximity to Italy would allow a significant part of the population to work in Italy without having to move out of Slovenia. International commuting might also explain why the Hungarian outflow of citizens to the EU-15 was significantly lower than that of other EU-8+2 countries. A large amount of commuting activity occurs between Hungary and its wealthy neighbour, Austria.

The above analysis suggests that as migration constitutes a relatively large share of the population in both home and host countries, it may have significant consequences for both labour markets and the age profile of societies. East-West migration will aggravate the ageing problem in the EU-8+2 countries, while it may relieve pressures in EU-15 countries. A more detailed discussion of these issues in individual countries follows below.

Figure 3.12 shows the age structure of migrants from the EU-8 and EU-2 to the EU-27. We use information from the Eurostat LFS statistics on the age profile of citizens from the EU-8 and EU-2 countries resident in the EU-15 to calibrate the approximate share of migrant population flows that are of school age (0-14), working age (15-64) and retired age (65+). The available information and sample sizes are too small to establish bilateral, time varying patterns, so we limit our adjustment to information on the average age shares between 2003-2009 of citizens from each of the EU-8 and EU-2 countries resident in the EU-27 as a whole (outside of their home country). More than 80 per cent of migrants are of working age, compared to an EU-27 average of about 65 per cent. There is a clear overrepresentation of working age citizens from all of the EU-8 and EU-2 countries.

Figure 3.12. Age structure of mobile EU-8 and EU2 citizens in the EU-27, average over 2003-2009



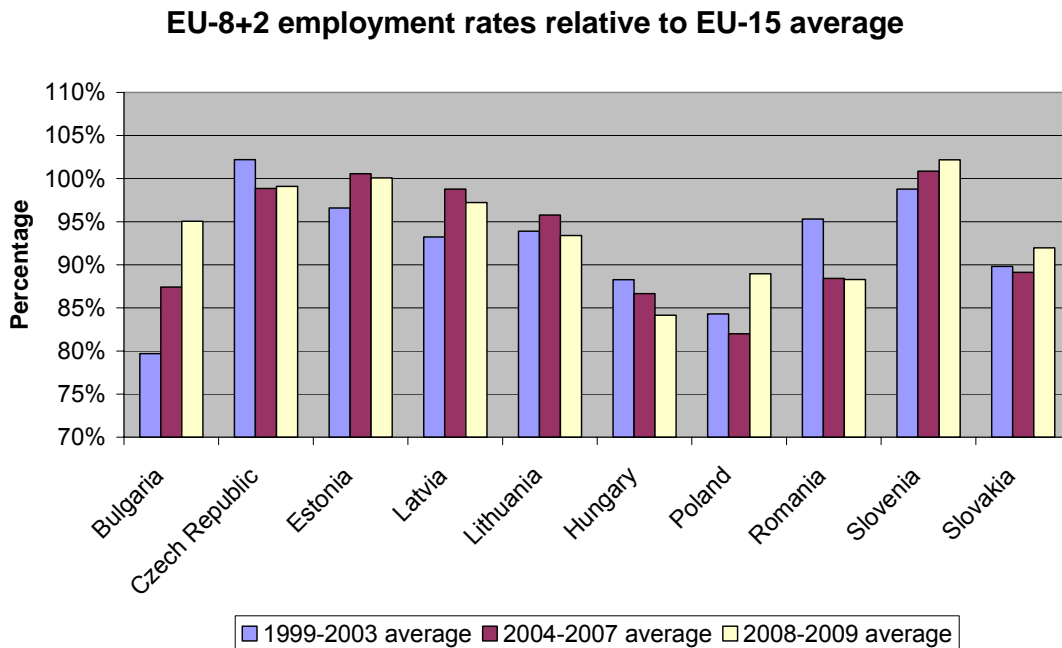
Source: Derived from Eurostat LFS series

As highlighted by the European Integration Consortium (2009) and Barrell, FitzGerald and Riley (2010), the skills implied by the occupational structure of workers mobile workers has tended to differ somewhat from their actual educational attainment. In section 3.4.2 we discuss the average educational attainment of EU-8 and EU-2 citizens residing in the EU-15, and the implications of this for the average level of productivity of migrant workers compared to native workers.

We now turn to an analysis of the domestic population in the EU-8+2 and EU-15 countries, as its characteristics will also determine the strength of migration effects on the labour market.

Figure 3.13 presents average employment rates relative to the EU-15 average employment rate for the time periods 1999-2003, 2004-2007 and 2008-2009.

Figure 3.13. Employment rates

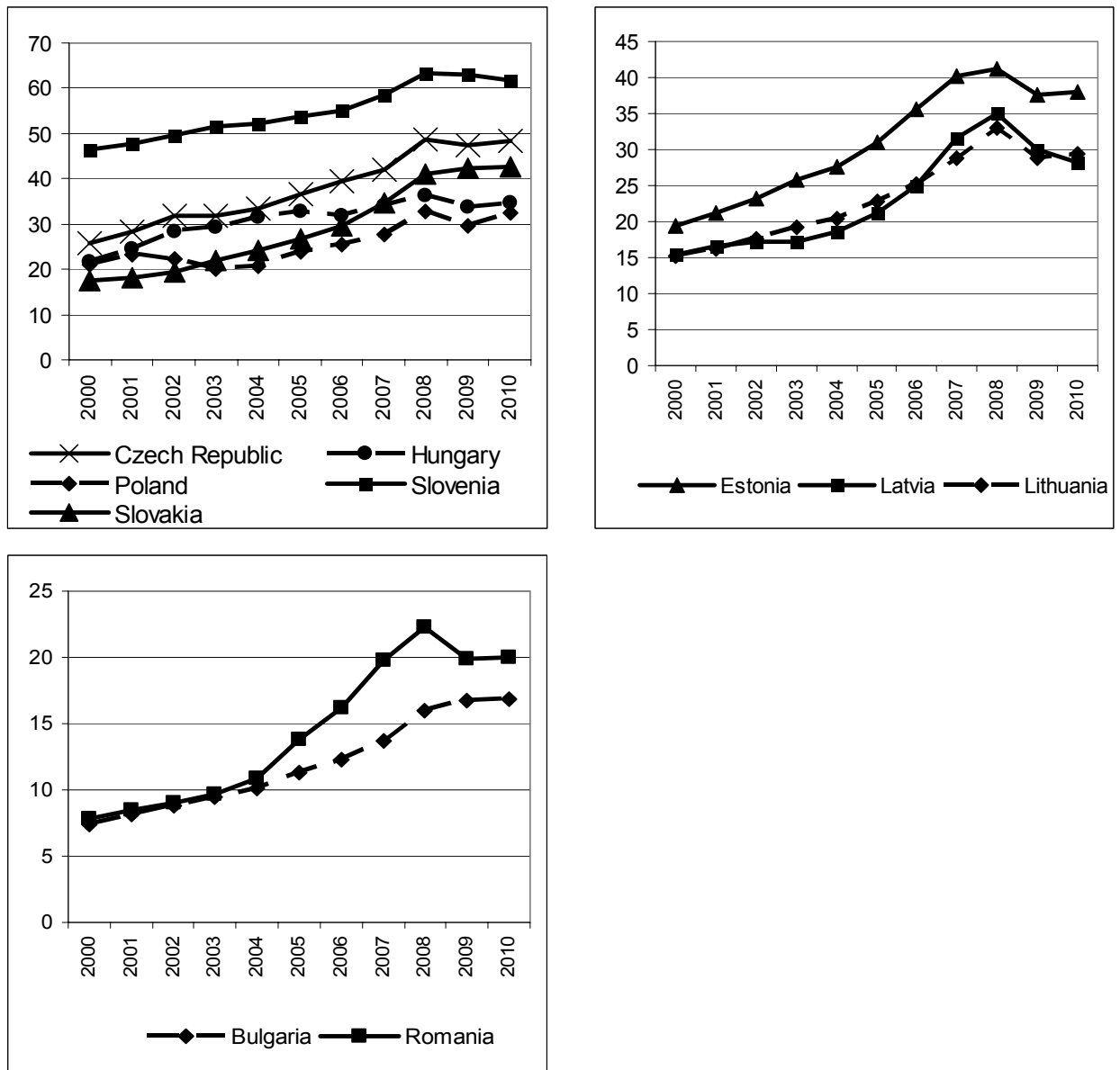


Source: Derived from Eurostat series

Figure 3.13 illustrates that employment rates in Slovenia, Estonia and the Czech Republic were approximately at the EU-15 level throughout the three time periods shown. A general trend of improvement relative to the 1999-2003 period can be observed. This can be explained by the gradual liberalisation and improved functioning of EU-8+2 labour markets, the fast economic expansion in these countries and unemployed workers seeking employment in EU-15 countries. Employment rates in the Czech Republic, Hungary, Romania and the Baltic countries decreased between 2008-2009 and the previous periods plotted. The most striking outliers are Bulgaria with its rapid improvement in employment over the entire time horizon, and Hungary with its steady worsening of employment figures, due to its comparatively worse economic performance since 2007.

The figure highlights the fact that the majority of migrants move to other EU countries for work purposes, and therefore the vast majority of migration from the EU-8+2 to the EU-15 countries is of an economic nature. In terms of GDP per capita, the EU-8+2 members remain relatively poorer than their Western European neighbours, as can be seen from figure 3.14.

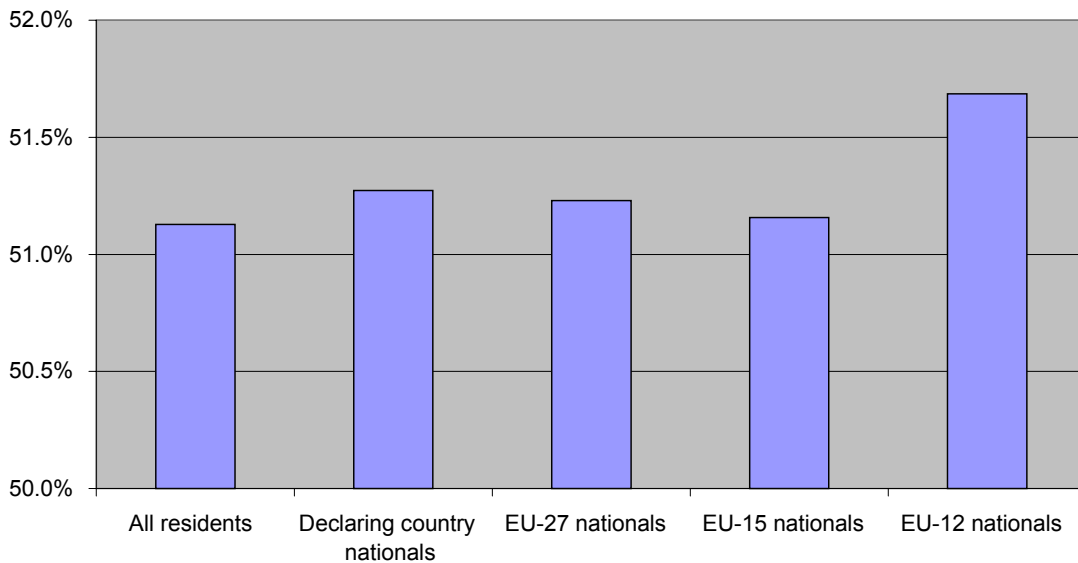
Figure 3.14. GDP per capita in EU-8+2 relative to the EU-15 average



Source: Ameco, current market prices per head of population, EU-15 = 100

Figure 3.14 shows the slow, but continuous, convergence of GDP per capita between the EU-8+2 and EU-15 country groups. This trend has been reversed somewhat towards the end of the sample period in many of the countries depicted, particularly the Baltic economies. It is likely that this reversal is attributable to the financial crisis and ensuing recession in 2008-09. While the levels of GDP per capita in the EU-8+2 group remain below those of the EU-15 countries, there also exist significant differences within the cross section of countries themselves. Slovenia is by far the wealthiest country amongst the EU-8 group, whereas the EU-2 countries have the lowest level of GDP per capita.

Figure 3.15. Share of women in the EU-15 population, by citizenship

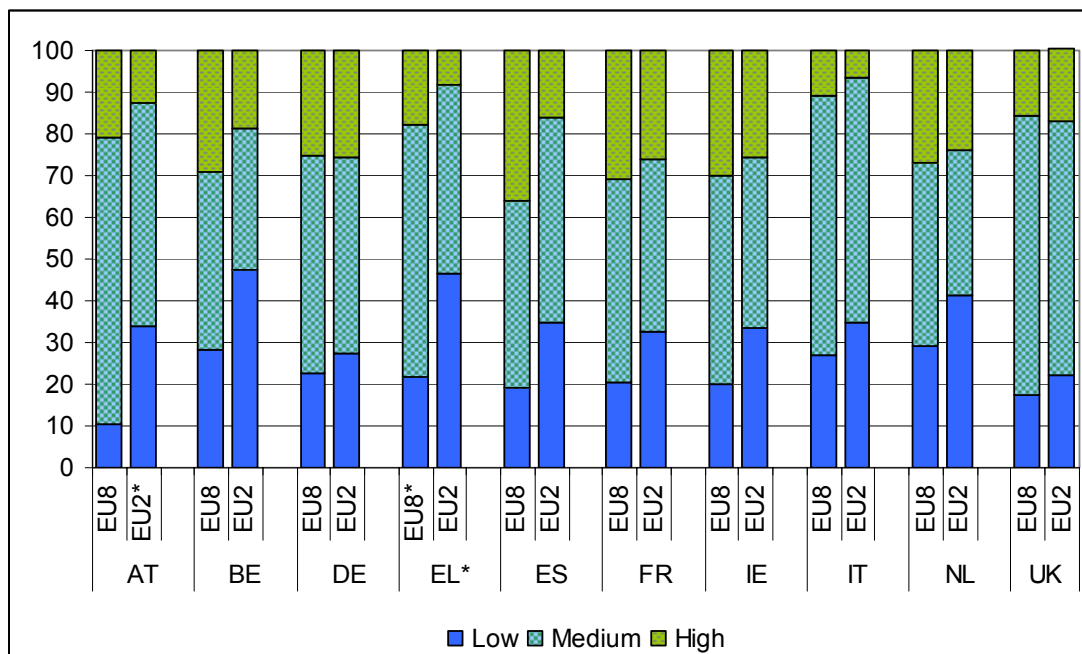


Source: Eurostat Population Statistics

The above chart illustrates the share of women in the EU-15 population, according to citizenship, as of 1 January 2010. The chart was created using Eurostat population statistics. For some countries where the full data were unavailable for 2010, we have used estimates based on the previous year's share of women. However, most of the estimates were for smaller countries such as Luxembourg or Greece, and therefore should not have had a big impact on the total figure for the EU-15 countries as a group. In general, it appears that the EU-12 (or EU10+2) citizens residing in EU-15 countries have a higher share of female population than all other groups. However, the magnitude of this bias is relatively small, with women accounting for 51.7 per cent of EU-12 citizens resident in the EU-15, compared to 51.1 per cent of EU-15 nationals.

Appendix table A1 at the end of this report shows the skill structure, based on educational attainment, of EU-8+2 migrants residing in the EU-15 in 2010. The source of this table is the EU Labour Force Survey. About 28 per cent of all EU-8+2 migrants working in EU-15 countries are low-skilled, 55 per cent are medium-skilled and 17 per cent are high-skilled. Luxembourg, Demark, Sweden and Ireland tend to attract high-skilled workers, while Greece, Portugal, Spain, Belgium, Netherlands and Finland are more popular destinations among those with low skills. Figure 3.16 shows the skill structure of EU-8 and EU-2 nationals residing in selected countries of the EU-15.

Figure 3.16. Skill structures of EU-8 and EU-2 nationals residing in selected EU-15 countries



* denotes lower reliability of data

Source: Labour Force Survey

Appendix table A2 reports the most popular occupations in which EU-8+2 nationals work in individual EU-15 countries. A large number, about 32 per cent, of EU-8+2 nationals living in EU-15 countries work in elementary occupations. About 54 per cent are employed in occupations requiring medium skills such as craft and related trades workers, service workers and shop and market sales workers. About 14 per cent of EU-8+2 nationals (that is 80 per cent of those with a university degree) work as legislators, senior officials, managers, professionals, technicians and associate professionals. Table 3.4 show shares of EU-8 and EU-2 nationals working in individual occupations.

Table 3.4. Occupational structure of EU-8 and EU-2 nationals residing and working in selected EU-15 countries

| | EU-8 | EU-2 | EU-8+2 |
|---------------------------------------------------|------|------|--------|
| Legislators senior officials and managers | 5 | 2 | 3 |
| Professionals | 7 | 3 | 5 |
| Technicians and associate professionals | 7 | 4 | 6 |
| Clerks | 6 | 3 | 4 |
| Service workers and shop and market sales workers | 17 | 15 | 16 |
| Skilled agricultural and fishery workers | 1 | 2 | 2 |
| Craft and related trades workers | 16 | 26 | 21 |
| Plant and machine operators and assemblers | 12 | 10 | 11 |
| Elementary occupations | 28 | 36 | 32 |

Source: Labour Force Survey

Table 3.5 on the education and occupational structure of EU-8 migrants in individual countries suggests that the incidence of downskilling – accepting employment in an occupation below one’s qualification level – is highest in Ireland, Denmark, Sweden and the UK.

Table 3.5. Skill and occupational structure of EU8 nationals in selected EU15 countries

| | Low skill occupations | Medium skill occupations | High skill occupations | Low education | Medium education | High education |
|----|-----------------------|--------------------------|------------------------|---------------|------------------|----------------|
| BE | 28 | 43 | 29 | 28 | 43 | 29 |
| DK | (29.9) | 46 | (24.0) | 18 | 38 | 44 |
| DE | 19 | 51 | 29 | 23 | 52 | 25 |
| IE | 24 | 65 | 11 | 20 | 50 | 30 |
| ES | 20 | 60 | 21 | 19 | 45 | 36 |
| FR | 19 | 51 | (18.9) | 20 | 49 | 31 |
| IT | 37 | 49 | 13 | 27 | 62 | 11 |
| LU | : | : | 83 | : | : | 81 |
| NL | 26 | 50 | 26 | 29 | 44 | 27 |
| AT | 17 | 52 | 31 | 11 | 69 | 21 |
| FI | (21.6) | 60 | : | 47 | 41 | : |
| SE | 19 | 54 | 27 | 27 | 31 | 42 |
| UK | 35 | 52 | 13 | 18 | 67 | 16 |

Data in parentheses denote lower reliability

Source: Labour Force Survey

Table 3.6. Skill and occupational structure of EU2 nationals in selected EU15 countries

| | Low skill occupations | Medium skill occupations | High skill occupations | Low education | Medium education | High education |
|----|-----------------------|--------------------------|------------------------|---------------|------------------|----------------|
| BE | (21.0) | 46 | 33 | 47 | 34 | 19 |
| DE | 20 | 48 | 32 | 27 | 47 | 26 |
| EL | 50 | 47 | : | 47 | 45 | 8 |
| ES | 41 | 55 | 4 | 35 | 49 | 16 |
| FR | (19.2) | 54 | (26.6) | 33 | 41 | 26 |
| IT | 37 | 59 | 4 | 35 | 59 | 7 |
| LU | : | : | (86.4) | : | : | (78.1) |
| NL | : | (50.2) | (29.9) | 41 | (34.6) | (23.9) |
| AT | 31 | 55 | (14.6) | 34 | 53 | (12.6) |
| UK | 29 | 53 | 18 | 22 | 61 | 17 |

Data in parentheses denote lower reliability

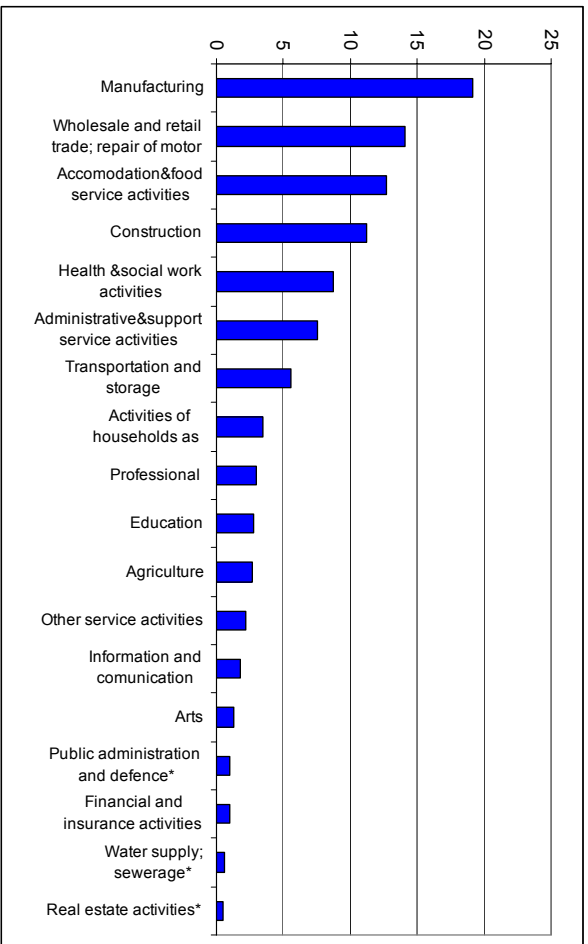
Source: Labour Force Survey

As for Romanian and Bulgarian workers, a relatively large proportion of the EU-2 migrant population with a higher qualification may work in lower-skilled occupations

in Spain, Greece and Italy (see table 3.6). The medium skilled migrant labour force may work below their qualification level in Spain and the UK.

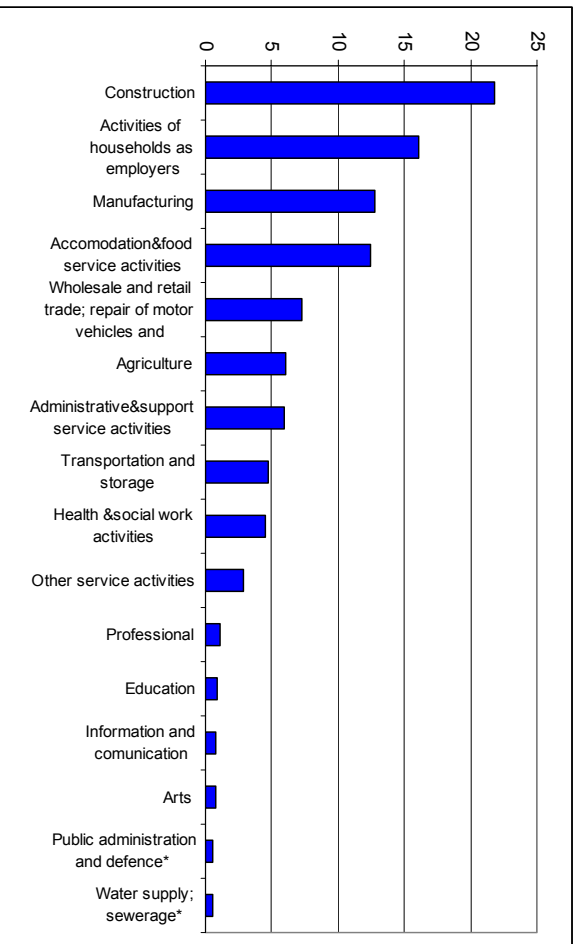
Appendix table A3 gives a detailed breakdown of sectors in which EU-8+2 workers are employed in individual EU-15 countries. EU-8+2 citizens resident in the EU-15 countries work to a large extent in the construction and manufacturing sectors. Figures 3.17 and 3.18 show shares of EU-8 and EU-2 migrant populations employed in individual sectors.

Figure 3.17. Sectoral structure of EU8 mobile workers in EU15 (2010)



* denotes lower reliability
 Source: Labour Force Survey

Figure 3.18. Sectoral structure of EU2 mobile workers in EU15 (2010)



* denotes lower reliability
 Source: Labour Force Survey

3.4 Macro-economic impact of population flows 2004-2009⁸

In this section we consider the macro-economic impact of the population flows from the EU-8 and EU-2 to the EU-15 economies since 2004, based on our migration matrix reported above. At this stage we do not attempt to identify the extent to which these population movements can be attributed to the EU accession process, but the results reported here could be viewed as an upper limit to the macro-economic impact of the 2004 EU enlargement. We consider the EU-8 separately from the EU-2, and look at the impacts on both the sending and receiving countries. We do not include flows from Malta and Cyprus in this analysis, as they are very small and we cannot separately identify the impacts in these countries within the modelling framework we adopt. Flows from the EU-2 to the EU-10 are relatively small (except in the case of Cyprus) and so are omitted from the analysis reported below. Note also that we cannot separately identify the impact on Luxembourg within the modelling framework we adopt. Total inflows from the EU-8 into Luxembourg over the period 2004-2009 amounted to about 1.3 per cent of the Luxembourg population with much smaller inflows from the EU-2, in relative terms similar to the flows to the UK. We could therefore make the assumption that the macro-economic impact in Luxembourg has been roughly the same in terms of magnitude as in the UK.

The methodological approach we adopt to assess the macro-economic impact of population movements is a series of model simulation exercises, using the National Institute's model, NiGEM, following the approach adopted by Barrell (2009), Barrell, Gottschalk, Kirby and Orazgani (2009) and Barrell, Riley and Fitzgerald (2010). NiGEM has been in use at the National Institute since 1987, and is also used by a group of about 50 model subscribers, mainly in the policy community. Current users include the Bank of England, the ECB, the IMF, the Bank of France, the Bank of Italy and the Bundesbank as well as most other central banks in Europe along with research institutes and finance ministries throughout Europe and elsewhere. NiGEM is a global model, and most EU countries are modelled individually (with the exception of Luxembourg, Cyprus and Malta). All country models contain the determinants of domestic demand, export and import volumes, prices, current accounts and net assets. Economies are linked through trade, competitiveness and financial markets and the models are solved simultaneously.

Further detail on NiGEM is provided in an appendix, but the core parts of the model relevant to the scenarios presented in this paper are the labour market and the production function in each economy. The speed of response of employment to changes in labour supply varies between countries, and is estimated, as are the long

⁸ Any comments or queries related to section 3.4 of the report can be addressed to Dawn Holland (d.holland@niesr.ac.uk).

run structural parameters of the production function, which are similar across countries.

Within the NiGEM model, labour markets in each country are described by a wage equation (see Barrell and Dury, 2003 for a detailed description) and a labour demand equation (see, for example, Barrell and Pain, 1997). The wage equations depend on productivity and unemployment, and have a degree of rational expectations embedded in them – that is to say the wage bargain is assumed to depend partly on expected future inflation and partly on current inflation. The speed of the wage adjustment is estimated for each country. Wages adjust to bring labour demand in line with labour supply. Employment depends on real wages, output and trend productivity, again with speeds of adjustment employment estimated for each country. Labour supply is treated as exogenous to factors other than population projections. Inward migration raises the population, which feeds directly into labour supply.

Production functions are based on a CES framework, with labour and capital as factor inputs, estimated rates of labour augmenting technical progress and an elasticity of substitution of around a half. The speed of adjustment of the equilibrium capital stock is estimated, and adjustment is toward expected output and its effects 4 years ahead. Forward looking adjustment means that it is possible to look at anticipated as well as unanticipated migration. Inward migration raises potential labour supply, and therefore raises potential output through the production function.

NiGEM allows us to model the bilateral labour flows from each of the EU-8 and EU-2 countries to each of the EU-15 countries, adjusting for shifts in the skill level and age structure of migrants. NiGEM is a quarterly model, allowing an empirical assessment of both the short-term and long-term impact on key macro-economic variables such as GDP, inflation, unemployment and wages. As all countries are simulated simultaneously, we can fully capture the positive and negative spillovers between countries. A rise in demand in one country will raise import demand in that country, raising exports and hence GDP in all of its trading partners. This will be offset to some degree by any shifts in competitiveness. For example, if wages fall in response to an inward migration shock the price level in that country will fall relative to the rest of the world, allowing a gain in competitiveness. This is particularly important within the single currency zone, as there will be no offsetting adjustment in exchange rates.

In tables 3.7-3.9 below we show the population flows from the EU-8 and EU-2 economies to the EU-15 between 2004 and 2009. The final two columns also put this into perspective, showing the aggregate inflows or outflows over the six year period, in total and relative to the size of the domestic population.

Table 3.7. Population net outflows to the EU-15, 2004-2009

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Total 2004-2009 | % 2004 Domestic Population |
|-----------|---------|---------|---------|---------|---------|---------|-----------------|----------------------------|
| Czech Rep | 9501 | -6846 | -24973 | -17329 | 1975 | 6714 | -30958 | -0.3 |
| Estonia | -2150 | -4627 | -3157 | -7756 | 1226 | -14948 | -31411 | -2.3 |
| Latvia | -524 | -8464 | -19753 | -6168 | -17385 | -5291 | -57586 | -2.5 |
| Lithuania | -15158 | -33929 | -44412 | -23459 | -33501 | 7543 | -142916 | -4.2 |
| Hungary | 5049 | -4925 | -16299 | -22279 | -16658 | -4622 | -59734 | -0.6 |
| Poland | -56953 | -139535 | -270353 | -282002 | -167715 | -545 | -917103 | -2.4 |
| Slovenia | 989 | -2212 | -1449 | -1457 | 454 | -2860 | -6535 | -0.3 |
| Slovakia | -5284 | -28039 | -11800 | -39575 | 6573 | -21911 | -100036 | -1.9 |
| EU8 | -64530 | -228578 | -392196 | -400026 | -225030 | -35919 | -1346279 | -1.8 |
| Bulgaria | -29040 | -28329 | -39487 | -64403 | -83536 | -20775 | -265570 | -3.4 |
| Romania | -175328 | -164942 | -227899 | -530610 | -293018 | -194710 | -1586508 | -7.3 |
| EU2 | -204369 | -193271 | -267386 | -595013 | -376554 | -215485 | -1852078 | -6.3 |

Source: Table 3.2

Table 3.8. Population net inflows from the EU-8, 2004-2009

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Total 2004-2009 | % 2004 Domestic Population |
|----------|--------|--------|--------|--------|--------|--------|-----------------|----------------------------|
| Belgium | 17013 | 18260 | -5788 | -5647 | 9641 | -152 | 33328 | 0.3 |
| Denmark | 808 | 2183 | 3276 | 5613 | 8254 | 3424 | 23557 | 0.4 |
| Germany | -42324 | 43072 | 80922 | 31885 | 9538 | 12274 | 135368 | 0.2 |
| Ireland | -3857 | 23842 | 72145 | 37343 | 33762 | -12506 | 150729 | 3.7 |
| Greece | 2334 | 1594 | -806 | -186 | 7183 | -5543 | 4577 | 0.0 |
| Spain | 13207 | 14920 | 32675 | 23820 | 10131 | 2361 | 97113 | 0.2 |
| France | 10528 | -9572 | 9947 | -6095 | 8650 | -1067 | 12392 | 0.0 |
| Italy | 12296 | 12128 | 14423 | 22864 | 11810 | 9244 | 82766 | 0.1 |
| Neths. | 4810 | 5357 | 5192 | 7984 | 11805 | 10961 | 46110 | 0.3 |
| Austria | 8142 | 7508 | 5573 | 6215 | 7197 | -3761 | 30874 | 0.4 |
| Portugal | 218 | 217 | 216 | 1055 | -63 | 371 | 2013 | 0.0 |
| Finland | 637 | 1808 | 2540 | 3161 | 3519 | 3715 | 15379 | 0.3 |
| Sweden | 2133 | 3639 | 6893 | 8569 | 8291 | 7721 | 37246 | 0.4 |
| UK | 38585 | 103622 | 164988 | 263445 | 95312 | 8876 | 674827 | 1.1 |
| EU-15 | 64530 | 228578 | 392196 | 400026 | 225030 | 35918 | 1346279 | 0.4 |

Source: Table 3.2

Table 3.9. Population net inflows from the EU-2, 2004-2009

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Total 2004-2009 | % 2004 Domestic Population |
|----------|--------|--------|--------|--------|--------|--------|-----------------|----------------------------|
| Belgium | 1407 | 2591 | 3296 | 7873 | 3506 | 7722 | 26394 | 0.3 |
| Denmark | 119 | 194 | 120 | 955 | 2070 | 2118 | 5576 | 0.1 |
| Germany | -20877 | -336 | 8208 | 20513 | 17104 | 20461 | 45073 | 0.1 |
| Ireland | 690 | 3182 | 2311 | 3506 | 5147 | -930 | 13906 | 0.3 |
| Greece | 9613 | 5403 | 1578 | 7944 | 13273 | 22491 | 60303 | 0.5 |
| Spain | 116739 | 119988 | 174194 | 225345 | 74427 | 26921 | 737615 | 1.7 |
| France | 9179 | -6083 | 27702 | 5848 | 7564 | 1376 | 45586 | 0.1 |
| Italy | 74961 | 51134 | 46838 | 296861 | 178766 | 96325 | 744885 | 1.3 |
| Neths. | 531 | 138 | 345 | 5850 | 5179 | 3009 | 15051 | 0.1 |
| Austria | 1259 | 825 | -121 | 6986 | 6080 | 22725 | 37754 | 0.5 |
| Portugal | 270 | -1993 | 1297 | 8911 | 9878 | 5428 | 23791 | 0.2 |
| Finland | 22 | 61 | 119 | 299 | 275 | 228 | 1004 | 0.0 |
| Sweden | 22 | 35 | -125 | 3202 | 2914 | 1720 | 7768 | 0.1 |
| UK | 10432 | 18132 | 1624 | 920 | 50372 | 5892 | 87371 | 0.1 |
| EU-15 | 204367 | 193271 | 267386 | 595013 | 376555 | 215486 | 1852077 | 0.5 |

Source: Table 3.2

The tables show that the population flows have had the biggest impact on Romania, with 7.3 per cent of the population emigrating to the EU-15 between 2004 and 2009. Bulgaria and Lithuania have also had a significant population loss over this period. Of the receiving countries, the biggest impact has been in Ireland. Elsewhere combined inflows from the EU-8 and EU-2 have amounted to 2 per cent or less of the total population.

In order to assess the macro-economic impact of population shifts between the EU-8/EU-2 and the EU-15 since 2004, we run two NiGEM model simulations, adjusting the level of the population in each country over a six year period by the value reported in tables 3.7-3.9 above. For example, we raise the level of the population in Belgium by 1407 in the first year, by a further 2591 in the second year, by 3296 in the third year, etc. For the purposes of this baseline scenario, we assume that the cumulative population shift between 2004-2009 is permanent, allowing us to assess the expected long-run impact as well as the short-run effects. After applying these exogenous “shocks” to the population in each country, we allow the model to run, to determine the impact that this change has on the major macro-economic indicators in each country. Tables 3.10-3.17 below report the expected impact on output, inflation and the unemployment rates in each country. We also report the expected impact on real wages (from the consumer’s perspective) in the EU-15 countries plus Poland, Hungary and the Czech Republic⁹.

⁹ The model we are working with does not explicitly measure wages in the other countries covered by this study and so we also cannot calculate the impact on aggregate EU-8/EU-2 wages. The biggest impacts can be expected in countries with the biggest short-term shifts in the unemployment rate.

Table 3.10. Impact of migration from EU-8 to EU-15 on GDP (%)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run | Long-run GDP per capita |
|------------------|-------|-------|-------|-------|-------|-------|----------|-------------------------|
| EU-8 | -0.02 | -0.09 | -0.22 | -0.38 | -0.47 | -0.48 | -1.25 | 0.62 |
| Czech Rep | 0.01 | -0.01 | -0.05 | -0.08 | -0.08 | -0.07 | -0.20 | 0.10 |
| Estonia | -0.02 | -0.11 | -0.22 | -0.42 | -0.58 | -0.95 | -2.45 | -0.13 |
| Hungary | 0.01 | -0.02 | -0.05 | -0.08 | -0.08 | -0.07 | -0.33 | 0.28 |
| Lithuania | -0.11 | -0.43 | -0.99 | -1.72 | -2.73 | -3.35 | -4.89 | -0.29 |
| Latvia | 0.00 | -0.04 | -0.24 | -0.58 | -1.32 | -1.75 | -2.80 | -0.14 |
| Poland | -0.03 | -0.11 | -0.29 | -0.44 | -0.47 | -0.37 | -1.46 | 1.00 |
| Slovenia | 0.02 | 0.03 | 0.02 | -0.04 | -0.11 | -0.18 | -0.34 | 0.00 |
| Slovakia | -0.01 | -0.18 | -0.40 | -0.79 | -1.05 | -1.34 | -1.92 | -0.09 |
| EU-15 | 0.02 | 0.05 | 0.09 | 0.13 | 0.17 | 0.20 | 0.33 | -0.01 |
| Belgium | 0.01 | 0.04 | 0.08 | 0.12 | 0.15 | 0.18 | 0.28 | -0.02 |
| Denmark | 0.01 | 0.04 | 0.08 | 0.12 | 0.18 | 0.24 | 0.42 | -0.02 |
| Finland | -0.01 | -0.02 | -0.01 | 0.00 | 0.02 | 0.04 | 0.18 | -0.10 |
| France | 0.02 | 0.03 | 0.04 | 0.06 | 0.07 | 0.08 | 0.04 | 0.02 |
| Germany | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.02 | 0.15 | -0.02 |
| Greece | 0.03 | 0.06 | 0.09 | 0.11 | 0.14 | 0.15 | 0.07 | 0.03 |
| Ireland | 0.03 | 0.11 | 0.27 | 0.59 | 0.98 | 1.31 | 2.43 | -0.79 |
| Italy | 0.01 | 0.02 | 0.04 | 0.05 | 0.06 | 0.07 | 0.12 | -0.02 |
| Neths | 0.02 | 0.05 | 0.08 | 0.09 | 0.11 | 0.13 | 0.25 | -0.03 |
| Austria | 0.02 | 0.05 | 0.08 | 0.11 | 0.13 | 0.15 | 0.30 | -0.07 |
| Portugal | 0.01 | 0.03 | 0.04 | 0.06 | 0.08 | 0.09 | 0.06 | 0.04 |
| Sweden | 0.01 | 0.02 | 0.04 | 0.06 | 0.09 | 0.11 | 0.32 | -0.08 |
| Spain | 0.01 | 0.03 | 0.05 | 0.07 | 0.09 | 0.10 | 0.17 | -0.04 |
| UK | 0.07 | 0.18 | 0.30 | 0.44 | 0.57 | 0.68 | 0.91 | -0.13 |

Table 3.11. Impact of migration from EU-8 to EU-15 on unemployment rate (percentage points)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run |
|------------------|-------|-------|-------|-------|-------|-------|----------|
| EU-8 | -0.04 | -0.16 | -0.35 | -0.48 | -0.45 | -0.27 | -0.05 |
| Czech Rep | 0.07 | 0.01 | -0.16 | -0.24 | -0.15 | -0.03 | -0.01 |
| Estonia | -0.08 | -0.20 | -0.14 | -0.31 | 0.04 | -0.53 | 0.00 |
| Hungary | 0.04 | -0.01 | -0.12 | -0.25 | -0.30 | -0.20 | -0.04 |
| Lithuania | -0.23 | -0.56 | -0.77 | -0.49 | -0.53 | 0.08 | -0.03 |
| Latvia | -0.03 | -0.18 | -0.48 | -0.24 | -0.35 | -0.17 | -0.01 |
| Poland | -0.08 | -0.26 | -0.60 | -0.89 | -0.89 | -0.54 | -0.10 |
| Slovenia | 0.02 | -0.05 | -0.06 | -0.03 | 0.00 | -0.07 | 0.00 |
| Slovakia | -0.05 | -0.26 | -0.13 | -0.36 | 0.04 | -0.16 | 0.00 |
| EU-15 | 0.01 | 0.02 | 0.04 | 0.04 | 0.02 | -0.01 | -0.01 |
| Belgium | 0.10 | 0.16 | 0.05 | -0.03 | 0.02 | 0.00 | 0.00 |
| Denmark | 0.00 | 0.01 | 0.01 | 0.04 | 0.07 | 0.02 | 0.00 |
| Finland | 0.01 | 0.02 | 0.04 | 0.04 | 0.04 | 0.03 | 0.01 |
| France | 0.01 | -0.02 | -0.01 | -0.03 | -0.02 | -0.02 | 0.00 |
| Germany | -0.01 | 0.02 | 0.04 | 0.02 | 0.01 | 0.01 | 0.00 |
| Greece | 0.00 | 0.00 | -0.02 | -0.01 | 0.03 | -0.02 | 0.00 |
| Ireland | -0.06 | 0.25 | 0.78 | 0.15 | -0.14 | -0.50 | -0.02 |
| Italy | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| Neths | 0.01 | 0.00 | -0.01 | 0.02 | 0.06 | 0.06 | -0.01 |
| Austria | 0.05 | 0.03 | 0.00 | 0.02 | 0.04 | -0.04 | 0.00 |
| Portugal | 0.00 | -0.01 | 0.00 | 0.00 | -0.01 | -0.01 | 0.00 |
| Sweden | 0.01 | 0.01 | 0.02 | 0.01 | 0.02 | 0.01 | 0.00 |
| Spain | 0.01 | 0.02 | 0.04 | 0.03 | 0.01 | 0.00 | 0.00 |
| UK | 0.03 | 0.06 | 0.12 | 0.22 | 0.10 | -0.01 | -0.01 |

Table 3.12. Impact of migration from EU-8 to EU-15 on real wages (%)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run |
|------------------|-------|-------|-------|-------|-------|-------|----------|
| Czech Rep | -0.02 | -0.05 | 0.01 | 0.19 | 0.36 | 0.44 | 0.26 |
| Hungary | -0.01 | -0.02 | 0.03 | 0.20 | 0.45 | 0.68 | 0.62 |
| Poland | 0.00 | 0.11 | 0.46 | 1.14 | 2.00 | 2.73 | 2.43 |
| Belgium | 0.00 | -0.02 | -0.06 | -0.08 | -0.09 | -0.11 | -0.09 |
| Denmark | 0.00 | 0.01 | 0.00 | -0.03 | -0.11 | -0.19 | -0.22 |
| Finland | 0.00 | -0.02 | -0.04 | -0.07 | -0.12 | -0.19 | -0.38 |
| France | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.03 | 0.07 |
| Germany | 0.01 | 0.02 | -0.02 | -0.08 | -0.13 | -0.16 | -0.17 |
| Greece | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.06 |
| Ireland | 0.03 | 0.02 | -0.34 | -0.90 | -1.32 | -1.60 | -1.64 |
| Italy | -0.01 | -0.01 | -0.02 | -0.04 | -0.06 | -0.07 | -0.07 |
| Neths | 0.00 | 0.00 | 0.00 | -0.02 | -0.05 | -0.09 | -0.24 |
| Austria | -0.03 | -0.08 | -0.13 | -0.18 | -0.28 | -0.31 | -0.33 |
| Portugal | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.05 |
| Sweden | -0.01 | -0.02 | -0.03 | -0.06 | -0.08 | -0.12 | -0.18 |
| Spain | 0.00 | 0.00 | -0.01 | -0.04 | -0.08 | -0.11 | -0.12 |
| UK | 0.00 | -0.02 | -0.07 | -0.19 | -0.35 | -0.42 | -0.39 |
| EU-15 | 0.00 | 0.00 | 0.00 | -0.03 | -0.07 | -0.10 | -0.13 |

Table 3.13. Impact of migration from EU-8 to EU-15 on HICP inflation (percentage points)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run |
|--------------|-------|-------|-------|-------|-------|-------|----------|
| EU-8 | 0.03 | 0.05 | 0.09 | 0.13 | 0.10 | 0.07 | -0.01 |
| Czech Rep | -0.01 | -0.01 | 0.00 | 0.02 | 0.03 | 0.02 | 0.00 |
| Estonia | 0.09 | 0.15 | 0.23 | 0.34 | 0.36 | 0.33 | -0.04 |
| Hungary | 0.00 | -0.01 | 0.00 | 0.01 | 0.02 | 0.02 | 0.00 |
| Lithuania | 0.20 | 0.43 | 1.02 | 1.52 | 1.30 | 0.96 | 0.04 |
| Latvia | 0.13 | -0.01 | 0.37 | 1.16 | 0.81 | 0.71 | 0.02 |
| Poland | 0.04 | 0.04 | 0.04 | 0.03 | 0.01 | 0.00 | -0.02 |
| Slovenia | 0.01 | 0.02 | 0.11 | 0.15 | 0.08 | 0.05 | -0.04 |
| Slovakia | 0.10 | 0.26 | 0.34 | 0.37 | 0.33 | 0.12 | -0.02 |
| EU-15 | 0.00 | 0.00 | -0.01 | -0.04 | -0.06 | -0.06 | -0.01 |
| Belgium | -0.01 | -0.02 | -0.03 | -0.02 | -0.02 | -0.01 | -0.01 |
| Denmark | -0.01 | -0.02 | -0.01 | -0.03 | -0.05 | -0.05 | -0.02 |
| Finland | -0.02 | -0.04 | -0.04 | -0.05 | -0.05 | -0.06 | -0.05 |
| France | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.00 |
| Germany | -0.01 | -0.02 | -0.03 | -0.05 | -0.05 | -0.04 | -0.01 |
| Greece | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | -0.01 |
| Ireland | -0.05 | -0.11 | -0.28 | -0.38 | -0.23 | -0.07 | 0.00 |
| Italy | 0.00 | 0.00 | 0.00 | -0.01 | -0.01 | -0.01 | -0.02 |
| Neths | -0.01 | -0.01 | 0.00 | -0.01 | -0.02 | -0.03 | -0.01 |
| Austria | -0.03 | -0.05 | -0.04 | -0.03 | -0.05 | -0.04 | -0.03 |
| Portugal | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 |
| Sweden | -0.02 | -0.04 | -0.04 | -0.04 | -0.05 | -0.05 | -0.03 |
| Spain | 0.00 | -0.01 | -0.01 | -0.02 | -0.03 | -0.02 | -0.03 |
| UK | 0.03 | 0.04 | 0.01 | -0.10 | -0.25 | -0.24 | -0.02 |

Table 3.14. Impact of migration from EU-2 to EU-15 on GDP (%)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run | Long-run GDP per capita |
|--------------|-------|-------|-------|-------|-------|-------|----------|-------------------------|
| EU-2 | -0.30 | -0.56 | -0.95 | -1.79 | -2.48 | -3.22 | -7.55 | -0.94 |
| Bulgaria | -0.08 | -0.18 | -0.39 | -0.79 | -1.38 | -1.87 | -4.04 | -0.33 |
| Romania | -0.37 | -0.67 | -1.11 | -2.09 | -2.80 | -3.61 | -8.52 | -0.89 |
| EU-15 | 0.01 | 0.03 | 0.06 | 0.10 | 0.13 | 0.17 | 0.34 | -0.12 |
| Belgium | 0.01 | 0.02 | 0.04 | 0.06 | 0.08 | 0.09 | 0.22 | -0.02 |
| Denmark | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.03 | 0.09 | -0.02 |
| Finland | -0.02 | -0.03 | -0.05 | -0.06 | -0.06 | -0.07 | -0.05 | -0.07 |
| France | 0.01 | 0.03 | 0.04 | 0.06 | 0.07 | 0.08 | 0.08 | 0.00 |
| Germany | -0.01 | -0.02 | -0.02 | -0.02 | -0.02 | -0.03 | 0.04 | -0.01 |
| Greece | 0.04 | 0.10 | 0.16 | 0.21 | 0.27 | 0.33 | 0.45 | -0.08 |
| Ireland | 0.00 | 0.00 | 0.02 | 0.04 | 0.06 | 0.08 | 0.22 | -0.08 |
| Italy | 0.02 | 0.07 | 0.15 | 0.23 | 0.34 | 0.46 | 0.93 | -0.28 |
| Neths | 0.01 | 0.02 | 0.02 | 0.03 | 0.02 | 0.01 | 0.07 | -0.02 |
| Austria | 0.00 | 0.00 | 0.01 | 0.04 | 0.06 | 0.09 | 0.35 | -0.10 |
| Portugal | 0.01 | 0.03 | 0.05 | 0.07 | 0.10 | 0.12 | 0.20 | -0.02 |
| Sweden | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.01 | 0.04 | -0.04 |
| Spain | 0.07 | 0.18 | 0.33 | 0.49 | 0.66 | 0.80 | 1.33 | -0.26 |
| UK | 0.00 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.13 | 0.00 |

Table 3.15. Impact of migration from EU-2 to EU-15 on unemployment rate (percentage points)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run |
|-----------------|-------|-------|-------|-------|-------|-------|----------|
| EU-2 | -0.32 | -0.37 | -0.51 | -1.10 | -0.86 | -0.54 | -0.01 |
| Bulgaria | -0.21 | -0.23 | -0.31 | -0.49 | -0.66 | -0.26 | -0.01 |
| Romania | -0.36 | -0.42 | -0.58 | -1.32 | -0.93 | -0.64 | -0.01 |
| EU-15 | 0.03 | 0.03 | 0.04 | 0.08 | 0.05 | 0.02 | 0.01 |
| Belgium | 0.00 | 0.01 | 0.01 | 0.04 | 0.04 | 0.06 | 0.00 |
| Denmark | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.00 |
| Finland | 0.00 | 0.01 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 |
| France | 0.01 | -0.01 | 0.01 | 0.00 | 0.00 | -0.01 | 0.00 |
| Germany | 0.00 | 0.01 | 0.01 | 0.02 | 0.01 | 0.02 | 0.00 |
| Greece | 0.03 | 0.01 | -0.03 | 0.00 | 0.04 | 0.09 | -0.01 |
| Ireland | 0.01 | 0.03 | 0.01 | 0.02 | 0.04 | -0.04 | 0.00 |
| Italy | 0.07 | 0.04 | 0.00 | 0.23 | 0.15 | -0.01 | 0.00 |
| Neths | 0.00 | -0.01 | -0.01 | 0.02 | 0.03 | 0.03 | -0.01 |
| Austria | 0.01 | 0.00 | -0.01 | 0.04 | 0.02 | 0.12 | 0.00 |
| Portugal | 0.00 | -0.02 | -0.01 | 0.04 | 0.05 | 0.02 | 0.00 |
| Sweden | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 |
| Spain | 0.13 | 0.15 | 0.17 | 0.23 | 0.05 | -0.07 | 0.00 |
| UK | 0.01 | 0.02 | 0.01 | 0.00 | 0.05 | 0.02 | -0.01 |

Table 3.16. Impact of migration from EU-2 to EU-15 on real wages (%)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run |
|-----------------|-------|-------|-------|-------|-------|-------|----------|
| Belgium | 0.00 | 0.00 | 0.00 | -0.01 | -0.03 | -0.05 | -0.09 |
| Denmark | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | -0.05 | -0.13 |
| Finland | -0.01 | -0.01 | -0.02 | -0.04 | -0.06 | -0.08 | -0.22 |
| France | 0.00 | 0.00 | 0.00 | -0.01 | -0.01 | -0.01 | 0.01 |
| Germany | 0.00 | 0.00 | -0.01 | -0.03 | -0.05 | -0.08 | -0.13 |
| Greece | 0.00 | -0.02 | -0.02 | -0.03 | -0.05 | -0.09 | -0.22 |
| Ireland | 0.00 | -0.02 | -0.04 | -0.06 | -0.11 | -0.15 | -0.16 |
| Italy | -0.04 | -0.10 | -0.12 | -0.27 | -0.54 | -0.69 | -0.71 |
| Neths | 0.00 | 0.00 | 0.01 | 0.01 | -0.01 | -0.03 | -0.15 |
| Austria | 0.00 | -0.01 | -0.01 | -0.03 | -0.06 | -0.19 | -0.44 |
| Portugal | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | -0.01 | -0.06 |
| Sweden | 0.00 | 0.00 | -0.01 | -0.02 | -0.03 | -0.04 | -0.09 |
| Spain | 0.00 | -0.04 | -0.13 | -0.30 | -0.53 | -0.73 | -0.69 |
| UK | 0.00 | -0.01 | -0.03 | -0.03 | -0.04 | -0.07 | -0.05 |
| EU-15 | -0.01 | -0.02 | -0.04 | -0.09 | -0.17 | -0.24 | -0.28 |

Table 3.17. Impact of migration from EU-2 to EU-15 on HICP inflation (percentage points)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Long-run |
|-----------------|-------|-------|-------|-------|-------|-------|----------|
| EU-2 | -0.13 | -0.11 | 0.03 | 0.09 | 0.57 | 0.92 | 0.03 |
| Bulgaria | 0.20 | 0.30 | 0.36 | 0.56 | 0.83 | 0.96 | -0.06 |
| Romania | -0.24 | -0.25 | -0.08 | -0.07 | 0.47 | 0.91 | 0.06 |
| EU-15 | 0.00 | -0.01 | -0.01 | -0.02 | -0.04 | -0.04 | -0.01 |
| Belgium | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.01 | -0.01 |
| Denmark | 0.00 | 0.00 | 0.01 | 0.00 | -0.01 | -0.02 | -0.02 |
| Finland | -0.01 | -0.02 | -0.02 | -0.02 | -0.03 | -0.02 | -0.04 |
| France | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 |
| Germany | 0.00 | -0.01 | -0.01 | -0.01 | -0.02 | -0.02 | -0.01 |
| Greece | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.00 | -0.02 |
| Ireland | -0.01 | -0.02 | -0.02 | -0.02 | -0.03 | -0.02 | 0.00 |
| Italy | -0.03 | -0.06 | -0.02 | -0.06 | -0.18 | -0.15 | -0.03 |
| Neths | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | -0.01 | -0.01 |
| Austria | -0.01 | -0.02 | -0.01 | -0.01 | -0.03 | -0.05 | -0.03 |
| Portugal | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | -0.01 |
| Sweden | -0.01 | -0.01 | -0.01 | -0.01 | -0.02 | -0.02 | -0.03 |
| Spain | -0.04 | -0.07 | -0.10 | -0.14 | -0.18 | -0.14 | -0.04 |
| UK | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | -0.03 | -0.01 |

Source: (Tables 3.10-3.17) NiGEM model simulation exercises

As regards the EU-15 economies, the first thing to note is that the impact of population flows from the EU-8 and EU-2 thus far has been small. The level of output in the EU-15 may have risen by about 0.7 per cent over the six year period to 2009 as a result of the population movements, adding about 0.1 percentage points to GDP growth per annum on average. This is based on the sum of the long-run impact on GDP of population flows from the EU-8 in table 3.10 (0.33) and the EU-2 in table 3.14 (0.34). We use the term ‘long-run’ to reflect the eventual shift that we would expect if all population flows since 2004 were permanent after allowing all short-term dynamic effects to feed through, and allow for no additional migration after 2009. The dynamics of adjustment differ across countries (that is the speed of adjustment to equilibria in different markets differs across countries), but as a general rule the model properties are such that we can assume that most countries reach their ‘long-run’ after about 7 years. By 2017, the impact of population flows from 2004-2009 will have probably mostly fed through into the economy.

Ireland and the UK have benefited more than others from populations flows from the EU-8, whereas Spain, Italy and Greece have benefited more from population flows from the EU-2. The impact on the unemployment rate in the EU-15 as a whole has been negligible, while we estimated that any temporary rise in unemployment rates in Ireland, the UK and Spain would have been more than offset by the rise in output by 2009. The 0.5 percentage point decline in the unemployment rate estimated for Ireland in 2009 partly reflects the short-term response to the net outflows of EU-8

migrants in that year. There should be no long-run impact on the unemployment rates in any country as a result of the population shifts. Real wages can be expected to fall in the receiving countries in order to bring the unemployment rate back into line, with negligible impact on inflation.

The shock to the sending countries is larger in magnitude than in the receiving countries, especially in Romania, Bulgaria and Lithuania. The loss of the labour force reduces potential output, and we estimate that GDP in Romania was 3.6 per cent lower in 2009 than it would have been had the population remained immobile. In the long-run there is a small negative impact on GDP per capita in Romania, reflecting a small rise in the long-term real interest rate. Unemployment rates in the sending countries are expected to have declined temporarily as a result of the population shifts, although as wages adjust this impact should dissipate over the next few years.

The tables above also report our estimated long-run impact on GDP and GDP per capita in each of the countries in our study. For the most part, the impact on GDP per capita of the shock is negligible. There is a significant positive impact expected in Poland, and a smaller negative impact in Ireland and Romania. Because we are working with an assumed underlying CES production function with an elasticity of substitution of about $\frac{1}{2}$, factor prices and input shares adjust in response to the population shocks, so that the impact on output of the shock is generally slightly smaller than the population shock itself.

3.4.1 Adjusting for the age structure

Our initial base case estimates reported above are based on the simplifying assumption that the age structure of migrants is identical to that in the destination country. However, we know that the population flows from the EU-8 and EU-2 since 2004 have been strongly dominated by individuals of working age, particularly within the 15-34 age bracket. Our preliminary results, therefore, will underestimate the impact of migration on potential output, as the population flows have a disproportionately large impact on the size of the labour force, and the results will also overestimate the impact on public finances, as people of working age tend to be net contributors to the government coffers.

In order to adjust for this bias, we use information from the Eurostat LFS statistics on the age profile of citizens from the EU-8 and EU-2 countries resident in the EU-15 to calibrate the approximate share of migrant population flows that are of school age (0-14), working age (15-64) and retired age (65+), as reported in the Descriptive Statistics section of this report. The figures for the EU-27 as a whole were more comprehensive and easily accessible than those for the EU-15, which would have been a preferable set of figures to fine tune the age structure our results. However, as

the vast majority of EU-8 and EU-2 citizens living in another EU member state reside in one of the EU-15 countries, this is unlikely to affect our results significantly.

We apply this adjustment to our population simulations presented in the previous section in order to assess the impact of the age structure. The total population is disaggregated into the three main age groups. The working age population plays a key role on the model, as it determines the size of the labour force and hence drives potential output. The school age and retired populations affect government transfer payments, and so feed into the macro-economy through public sector expenditure, which must be matched by tax revenue if the budget balance is to remain stable. But tax receipts in this case will have already overcompensated for the extra transfer payments, as the newly arrived population of working age settles into employment and finds work.

Table 3.18. Long-run impact on output before and after age adjustment EU-8 migration to EU-15 countries

| | Long-run impact on GDP | | Long-run impact on GDP per capita | |
|------------------|------------------------|--------------|-----------------------------------|--------------|
| | Unadjusted | Age adjusted | Unadjusted | Age adjusted |
| Czech Rep | -0.20 | -0.24 | 0.10 | 0.05 |
| Estonia | -2.45 | -2.98 | -0.13 | -0.65 |
| Hungary | -0.33 | -0.41 | 0.28 | 0.20 |
| Lithuania | -4.89 | -5.95 | -0.29 | -1.40 |
| Latvia | -2.80 | -3.32 | -0.14 | -0.69 |
| Poland | -1.46 | -1.75 | 1.00 | 0.70 |
| Slovenia | -0.34 | -0.40 | 0.00 | -0.08 |
| Slovakia | -1.92 | -2.33 | -0.09 | -0.51 |
| EU-8 | -1.25 | -1.51 | 0.62 | 0.36 |
| Belgium | 0.28 | 0.36 | -0.02 | 0.06 |
| Denmark | 0.42 | 0.56 | -0.02 | 0.13 |
| Finland | 0.18 | 0.24 | -0.10 | -0.04 |
| France | 0.04 | 0.04 | 0.02 | 0.02 |
| Germany | 0.15 | 0.19 | -0.02 | 0.02 |
| Greece | 0.07 | 0.08 | 0.03 | 0.04 |
| Ireland | 2.43 | 3.02 | -0.79 | 0.01 |
| Italy | 0.12 | 0.15 | -0.02 | 0.01 |
| Neths | 0.25 | 0.31 | -0.03 | 0.04 |
| Austria | 0.30 | 0.39 | -0.07 | 0.03 |
| Portugal | 0.06 | 0.06 | 0.04 | 0.04 |
| Sweden | 0.32 | 0.37 | -0.08 | -0.02 |
| Spain | 0.17 | 0.21 | -0.04 | 0.01 |
| UK | 0.91 | 1.24 | -0.13 | 0.20 |
| EU-15 | 0.33 | 0.43 | -0.01 | 0.10 |

Source: NiGEM model simulation exercise

Our results reported in tables 3.18-3.19 compare the unadjusted long-run impact on GDP and GDP per capita from tables 3.10 and 3.14 above to a population shift of the same magnitude after adjusting for the age structure of migrants. Given the bias towards migrants of working age, the impact on GDP is bigger in magnitude than in the preliminary scenario. GDP in the sending countries falls further below base, as the population loss is focused on the productive share of the population. The impact is particularly large in Bulgaria and Romania, where we estimate the population outflows have reduced potential output by 5.4 and 10.6 per cent, respectively. The impact on GDP per capita in the sending countries is also more likely to be negative, as the share of people contributing to GDP has declined relative to the size of the population. We expect a negative impact on GDP per capita in Estonia, Lithuania, Latvia, Slovakia, Bulgaria and Romania.

In the receiving countries, the impact on GDP is slightly more positive after adjusting for the age structure. The impact on GDP per capita is also more likely to be slightly positive than in the preliminary scenario, although again the impacts are small and negligible in most cases.

Table 3.19. Long-run impact on output before and after age adjustment EU-2 migration to EU-15 countries

| | Long-run impact on GDP | | Long-run impact on GDP per capita | |
|-----------------|------------------------|----------|-----------------------------------|----------|
| | Unadjusted | Age | Unadjusted | Age |
| | | adjusted | | adjusted |
| Bulgaria | -4.04 | -5.35 | -0.33 | -1.70 |
| Romania | -8.52 | -10.57 | -0.89 | -3.11 |
| EU-2 | -7.55 | -9.43 | -0.94 | -2.96 |
| Belgium | 0.22 | 0.29 | -0.02 | 0.05 |
| Denmark | 0.09 | 0.11 | -0.02 | 0.01 |
| Finland | -0.05 | -0.06 | -0.07 | -0.08 |
| France | 0.08 | 0.09 | 0.00 | 0.02 |
| Germany | 0.04 | 0.05 | -0.01 | -0.01 |
| Greece | 0.45 | 0.62 | -0.08 | 0.09 |
| Ireland | 0.22 | 0.28 | -0.08 | 0.00 |
| Italy | 0.93 | 1.28 | -0.28 | 0.05 |
| Neths | 0.07 | 0.09 | -0.02 | 0.00 |
| Austria | 0.35 | 0.46 | -0.10 | 0.02 |
| Portugal | 0.20 | 0.25 | -0.02 | 0.03 |
| Sweden | 0.04 | 0.04 | -0.04 | -0.05 |
| Spain | 1.33 | 1.69 | -0.26 | 0.14 |
| UK | 0.13 | 0.17 | 0.00 | 0.04 |
| EU-15 | 0.34 | 0.44 | -0.12 | -0.02 |

Source: NiGEM model simulation exercise

3.4.2 Adjusting for productivity

Our initial base case scenario is based on the simplifying assumption that the average productivity level of mobile workers is the same as both the average level within the home economy and the average level within the destination economy. Both of these conditions, clearly, cannot hold at the same time, as we know that average levels of productivity differ across the sending and receiving regions.

Tables 3.21-3.22 below report the average educational level of native residents in each of the sending and receiving countries, as well as the average educational level of the outward migrant population from the EU-8 and EU-2 and the inward migrant population in the EU-15 countries from the EU-8 and EU-2.

A standard measure of the returns to education is a wage premium, calculated as the average wage of workers of a given education level relative to a worker with a minimal level of education. If we assume employees, on average, are paid their marginal product, this can also be viewed as a measure of the average level of productivity of workers of a given education level relative to workers with the minimal level of education.

Table 3.20. Wage premium for high and medium skills, 2005

| | High | medium |
|--------------------------|------|--------|
| Belgium | 2.11 | 1.36 |
| Denmark | 2.17 | 1.53 |
| Finland | 1.76 | 1.12 |
| France | 1.96 | 1.21 |
| Germany | 3.06 | 1.63 |
| Greece | 3.31 | 2.15 |
| Ireland | 2.84 | 1.5 |
| Italy | 2.34 | 1.45 |
| Neths | 2.36 | 1.42 |
| Austria | 2.21 | 1.48 |
| Portugal | 2.34 | 1.45 |
| Sweden | 1.66 | 1.16 |
| Spain | 2.23 | 1.31 |
| UK | 2.4 | 1.53 |
| EU-8 + 2 estimate | 3 | 1.37 |

Source: Derived from EUKLEMS

Table 3.21. Educational attainment of resident population of the EU-8+2 and migrant population from the EU-8+2 to the EU-15, 2008

| | Resident population | | | Migrant population | | | Resident/Migrant ratio | | |
|------------|---------------------|--------|------|--------------------|--------|------|------------------------|--------|------|
| | Low | Medium | High | Low | Medium | High | Low | Medium | High |
| Czech Rep. | 0.16 | 0.71 | 0.13 | 0.19 | 0.51 | 0.29 | 0.80 | 1.39 | 0.44 |
| Estonia | 0.20 | 0.51 | 0.29 | 0.29 | 0.48 | 0.24 | 0.69 | 1.07 | 1.24 |
| Hungary | 0.26 | 0.58 | 0.17 | 0.20 | 0.47 | 0.33 | 1.27 | 1.24 | 0.50 |
| Latvia | 0.23 | 0.56 | 0.22 | 0.21 | 0.54 | 0.25 | 1.08 | 1.03 | 0.87 |
| Lithuania | 0.18 | 0.57 | 0.25 | 0.23 | 0.53 | 0.24 | 0.78 | 1.07 | 1.06 |
| Poland | 0.19 | 0.64 | 0.17 | 0.25 | 0.48 | 0.27 | 0.77 | 1.34 | 0.62 |
| Slovakia | 0.17 | 0.71 | 0.13 | 0.19 | 0.57 | 0.23 | 0.86 | 1.23 | 0.54 |
| Slovenia | 0.21 | 0.59 | 0.20 | 0.28 | 0.58 | 0.14 | 0.76 | 1.01 | 1.44 |
| Bulgaria | 0.28 | 0.53 | 0.19 | 0.33 | 0.44 | 0.23 | 0.84 | 1.21 | 0.82 |
| Romania | 0.30 | 0.59 | 0.11 | 0.33 | 0.48 | 0.19 | 0.89 | 1.25 | 0.58 |

Source: Derived from Eurostat LFS series

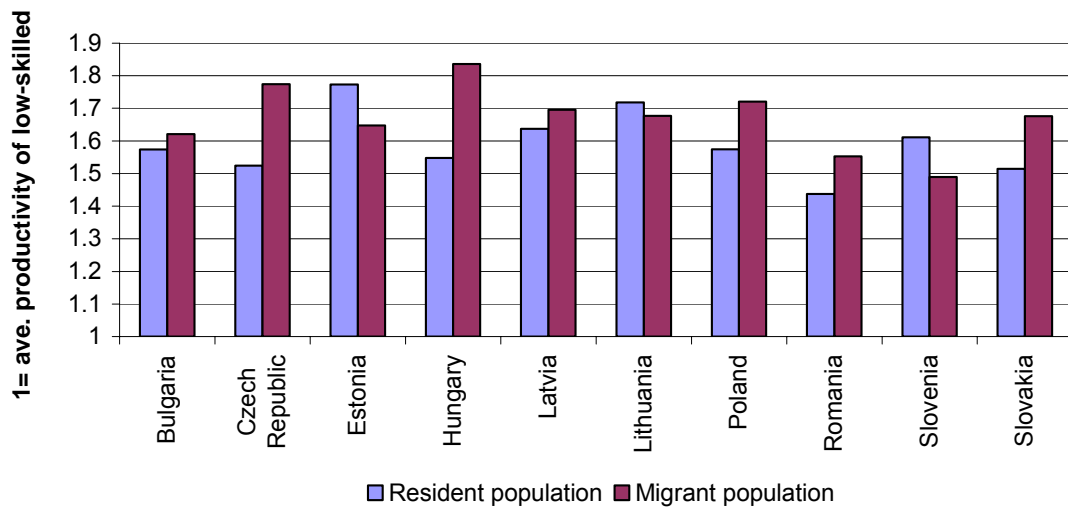
Table 3.22. Educational attainment of resident population of the EU-15 and migrant population from the EU-8+2 to the EU-15

| | Resident population | | | Migrant population | | | Resident/Migrant ratio | | |
|----------------|---------------------|--------|------|--------------------|--------|------|------------------------|--------|------|
| | Low | Medium | High | Low | Medium | High | Low | Medium | High |
| Austria | 0.24 | 0.61 | 0.15 | 0.21 | 0.59 | 0.20 | 1.14 | 1.04 | 0.75 |
| Belgium | 0.33 | 0.38 | 0.29 | 0.32 | 0.38 | 0.30 | 1.04 | 1.00 | 0.96 |
| Germany | 0.22 | 0.56 | 0.22 | 0.22 | 0.55 | 0.24 | 1.01 | 1.03 | 0.92 |
| Denmark | 0.31 | 0.42 | 0.27 | 0.20 | 0.47 | 0.33 | 1.57 | 0.88 | 0.83 |
| Spain | 0.50 | 0.24 | 0.27 | 0.32 | 0.43 | 0.24 | 1.53 | 0.54 | 1.11 |
| Finland | 0.25 | 0.45 | 0.30 | 0.43 | 0.38 | 0.18 | 0.59 | 1.16 | 1.64 |
| France | 0.32 | 0.42 | 0.25 | 0.25 | 0.38 | 0.37 | 1.27 | 1.12 | 0.69 |
| Greece | 0.40 | 0.40 | 0.20 | 0.39 | 0.46 | 0.15 | 1.01 | 0.88 | 1.32 |
| Ireland | 0.32 | 0.37 | 0.31 | 0.21 | 0.49 | 0.31 | 1.53 | 0.77 | 1.01 |
| Italy | 0.47 | 0.40 | 0.13 | 0.34 | 0.52 | 0.14 | 1.37 | 0.77 | 0.96 |
| Netherlands | 0.31 | 0.40 | 0.28 | 0.40 | 0.31 | 0.28 | 0.78 | 1.30 | 0.99 |
| Portugal | 0.70 | 0.17 | 0.13 | 0.46 | 0.48 | 0.06 | 1.51 | 0.35 | 2.15 |
| Sweden | 0.25 | 0.48 | 0.28 | 0.25 | 0.38 | 0.37 | 0.96 | 1.27 | 0.75 |
| United Kingdom | 0.26 | 0.45 | 0.29 | 0.23 | 0.58 | 0.19 | 1.17 | 0.77 | 1.51 |
| EU-27 | 0.32 | 0.47 | 0.22 | 0.26 | 0.48 | 0.26 | 1.23 | 0.97 | 0.83 |

Source: Derived from Eurostat LFS series

We use the wage premiums calculated above as an estimate of the level of productivity of the high- and medium-skilled workers relative to the low-skilled workers in each country. For example, high-skilled workers in the EU-8 and EU-2 economies are estimated to be roughly 3 times as productive as low-skilled workers, while medium skilled workers in these countries are estimated to be about 40 per cent more productive than low-skilled workers. Based on this information and the educational shares in each country we can estimate the average level of productivity in each country.

Figure 3.19. Average productivity estimates of resident and migrant populations



Note: Caution should be taken when comparing levels across countries
 Source: Derived from tables 3.17 and 3.19

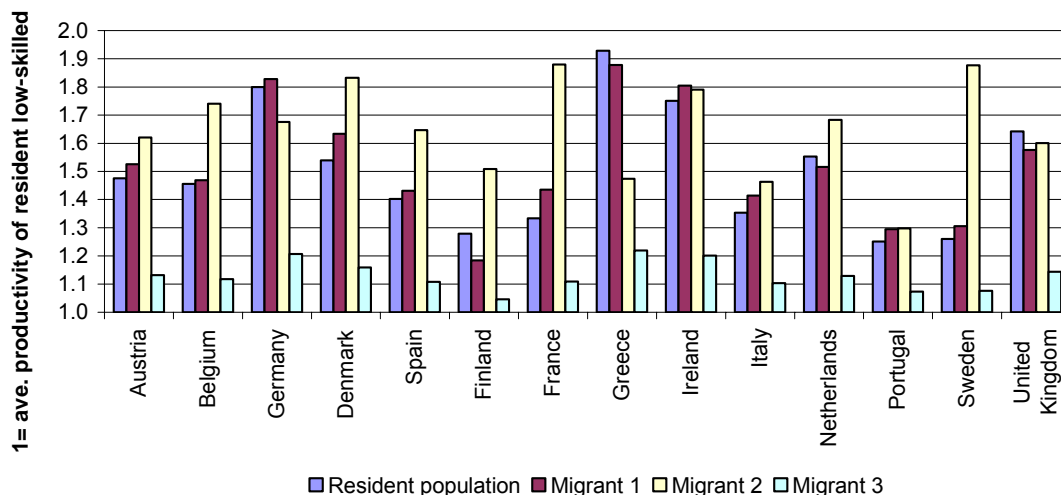
Figure 3.19 above illustrates the average productivity levels in each of the sending countries, and compares this to the average level in the fraction of the population that is emigrating to the EU-15. In the majority of countries, migrants tend to be biased towards the more highly educated, so that the average productivity level of outward migrants is somewhat higher than the average in the resident population. This does not appear to be the case in Estonia, Lithuania or Slovenia, however.

If the more productive workers are emigrating, this means that the average productivity level in the remaining resident population will be slightly lower than if they had remained at home, and illustrates the impact of a “brain drain” on the economy. This suggests that the base case estimates produced in the previous section on the impact of population flows on GDP may underestimate the actual impact on GDP, as average productivity will be slightly lower as a result. We can allow for this in our simulation, by shifting the average productivity level of the population in both sending and receiving countries.

It is not straightforward to establish the average productivity of inward migrants of a given education level once they arrive in their destination country. It may be that their average productivity level is the same as it was in their home country. Alternatively, as they may be working in a different sector, or with machinery of a different quality in the destination country compared to the home country, their productivity may be the same as a domestic resident in the host country with the same educational level. The European Integration Consortium (2009) highlights the fact that while migrants from the EU-8 tend to have a relatively high level of education, they have found work in the EU-15 countries predominantly in low-skilled occupations. This is confirmed by Kirby, Mitchell and Riley (2008) for the UK. This evidence of ‘downskilling’ suggests that the level of output produced by EU-8 migrants working in the EU-15 may be well below what we expect, given their level of educational attainment. The econometric estimates reported in table 6.8 of the European Integration Consortium (2009) report suggest that the return to education of new migrants from the EU-8 employed in the EU-15 is about 20-50 per cent that of the native population. While the lower bound of these estimates may seem implausibly low, we include this as a lower limit to our scenario. The difficulty of establishing the productive capacity of inward migrants is aggravated by the fact that the levels of returns to education should not strictly be compared across countries, as this imposes the assumption that the productive capacity of workers with low-skills is common across all the countries in our sample.

In order to allow for the potential measurement errors as well as conceptual approaches we establish three different scenarios. In all three cases, migrant workers with a low level of educational attainment are assumed to be as productive as native residents with a low level of educational attainment. The differences are in the productivity premiums applied to workers with medium and high levels of educational attainment, which are based on different assumptions regarding the wage premiums reported in table 3.20. In the first scenario we assume the returns to education are the same as they are for native residents in the host country, and apply the wage premiums of the individual EU-15 countries. In the second scenario we assume the returns to education are the same as in the home countries, so apply a premium of 37 per cent relative to the low-skilled to workers with a medium level of educational attainment and a premium of 200 per cent to workers with a high level of educational attainment. In the third scenario we adjust the wage premiums reported in table 3.20, and apply only 20 per cent of the premium to migrant workers from the EU-8 and EU-2. For example, workers with a medium level of education from the EU-8 and EU-2 residing in Ireland are treated as 10 per cent more productive than those with a low-level of education, rather than the 50 per cent return applied to native workers with a medium level of education. Figure 3.20 below illustrates average productivity of the resident population compared to our three scenarios for average productivity of inward migrants from the EU-8 and EU-2 economies.

Figure 3.20. Average productivity of resident and inward migrants – 3 estimates



Note: Migrant 1 assumes returns to education of inward migrants is the same as that of native residents; Migrant 2 assumes returns to education of inward migrants is the same as that in the home country; Migrant 3 assumes the return to education of inward migrants is 20 per cent that of native residents.
 Source: Derived from tables 3.20-3.22.

The discrepancies are very large. In almost all countries (with the exceptions of Greece and the UK) in at least one of the scenarios the average productivity level of inward migrants is higher than in the resident population. Equally, there is at least one scenario in which the inward migrants are less productive. In tables 3.24-3.27 below we report the long-run impact on GDP before and after adjusting for productivity under the three scenarios. We run this with the age-adjusted population shocks to derive a set of final estimates that include both the age and productivity adjustments.

Notwithstanding the size of the discrepancies in the estimated productivity levels of migrants shown in the figures above, the impact of these differences on GDP and the macro-economy is marginal in most cases. Tables 3.23-3.26 report the expected impact on GDP and GDP per capita in both the home and host countries, after taking into account both the age profile and our three estimates of the impact on productivity. The biggest variance in the estimates is seen in the impact of population flows from the EU-8 to Ireland, with the long-run impact on GDP, after taking into account age and productivity, is expected to lie between 1.9 and 3.1 per cent. There are also some estimated differences in the impact of EU-8 flows to the UK and Denmark and of EU-2 flows to Spain, although the percentage point differences do not exceed 0.6 in any country other than Ireland.

**Table 3.23. Long-run impact on output before and after productivity adjustment
 EU-8 migration to EU-15 countries**

| | Long-run impact on GDP | | | |
|------------------|------------------------|----------------|----------------|----------------|
| | Age adjusted | Productivity 1 | Productivity 2 | Productivity 3 |
| Czech Rep | -0.24 | -0.28 | -0.28 | -0.28 |
| Estonia | -2.98 | -3.00 | -3.00 | -3.00 |
| Hungary | -0.41 | -0.50 | -0.49 | -0.50 |
| Lithuania | -5.95 | -5.96 | -5.96 | -5.96 |
| Latvia | -3.32 | -3.31 | -3.31 | -3.31 |
| Poland | -1.75 | -1.93 | -1.93 | -1.94 |
| Slovenia | -0.40 | -0.40 | -0.40 | -0.40 |
| Slovakia | -2.33 | -2.31 | -2.31 | -2.32 |
| EU-8 | -1.51 | -1.62 | -1.62 | -1.62 |
| Belgium | 0.36 | 0.36 | 0.43 | 0.28 |
| Denmark | 0.56 | 0.59 | 0.66 | 0.42 |
| Finland | 0.24 | 0.23 | 0.28 | 0.20 |
| France | 0.04 | 0.04 | 0.05 | 0.04 |
| Germany | 0.19 | 0.19 | 0.18 | 0.12 |
| Greece | 0.08 | 0.08 | 0.06 | 0.05 |
| Ireland | 3.01 | 3.12 | 3.09 | 1.91 |
| Italy | 0.15 | 0.15 | 0.16 | 0.12 |
| Neths | 0.31 | 0.31 | 0.34 | 0.23 |
| Austria | 0.39 | 0.40 | 0.43 | 0.30 |
| Portugal | 0.06 | 0.06 | 0.06 | 0.05 |
| Sweden | 0.37 | 0.39 | 0.55 | 0.32 |
| Spain | 0.21 | 0.21 | 0.25 | 0.16 |
| UK | 1.24 | 1.19 | 1.21 | 0.87 |
| EU-15 | 0.43 | 0.43 | 0.44 | 0.30 |

Source: NiGEM Model simulation exercises

Table 3.24. Long-run impact on GDP per capita before and after productivity adjustment EU-8 migration to EU-15 countries

| | Long-run impact on GDP per capita | | | |
|------------------|-----------------------------------|----------------|----------------|----------------|
| | Age adjusted | Productivity 1 | Productivity 2 | Productivity 3 |
| Czech Rep | 0.05 | 0.02 | 0.02 | 0.01 |
| Estonia | -0.65 | -0.69 | -0.69 | -0.70 |
| Hungary | 0.20 | 0.12 | 0.12 | 0.11 |
| Lithuania | -1.40 | -1.41 | -1.41 | -1.41 |
| Latvia | -0.69 | -0.67 | -0.67 | -0.67 |
| Poland | 0.70 | 0.52 | 0.52 | 0.51 |
| Slovenia | -0.08 | -0.06 | -0.06 | -0.06 |
| Slovakia | -0.51 | -0.49 | -0.49 | -0.49 |
| EU-8 | 0.36 | 0.25 | 0.25 | 0.25 |
| Belgium | 0.06 | 0.05 | 0.12 | -0.03 |
| Denmark | 0.13 | 0.15 | 0.22 | -0.02 |
| Finland | -0.04 | -0.05 | 0.01 | -0.08 |
| France | 0.02 | 0.02 | 0.03 | 0.02 |
| Germany | 0.02 | 0.03 | 0.01 | -0.04 |
| Greece | 0.04 | 0.03 | 0.02 | 0.01 |
| Ireland | 0.01 | -0.12 | -0.14 | -1.29 |
| Italy | 0.01 | 0.02 | 0.02 | -0.01 |
| Neths | 0.04 | 0.03 | 0.06 | -0.04 |
| Austria | 0.03 | 0.04 | 0.06 | -0.07 |
| Portugal | 0.04 | 0.04 | 0.04 | 0.04 |
| Sweden | -0.02 | -0.01 | 0.15 | -0.08 |
| Spain | 0.01 | 0.00 | 0.04 | -0.05 |
| UK | 0.20 | 0.15 | 0.17 | -0.17 |
| EU-15 | 0.10 | 0.09 | 0.10 | -0.03 |

Source: NiGEM Model simulation exercises

The impacts on GDP per capita are again marginal in most cases, but the assumptions regarding the productivity of mobile workers have a significant impact on some results, especially in Ireland. These estimates suggest that if the return to education of EU-8 citizens resident in the EU-15 were as low as the lower bound estimated by the European Integration Consortium (2009), the moderation in average productivity could more than offset all of the positive impacts from inward migration, leaving GDP per capita somewhat lower in the long-run than it would have been in the absence of immigration. We consider this lower bound an extreme position, but include it in our results for completeness.

Our final set of estimates of the macro-economic impact of population flows from the EU-8 to the EU-15 between 2004-2009 suggest that the level of GDP can be expected to be 1.9-3.1 per cent higher in Ireland than it otherwise would have been, while than in the UK can be expected to be 0.9-1.2 per cent higher. Other fairly large impacts are estimated in Denmark and Sweden, while in the other EU-15 economies the impact can be expected to be small, at less than ½ per cent. The impact on GDP in the sending countries is expected to be negative everywhere, with the biggest impact expected in Lithuania, where the level of GDP is expected to be roughly 6 per cent below where it would have been had the migrant population remained at home. The impacts in Estonia and Latvia are also expected to be large, with GDP expected to be down by 3-3.3 per cent, while Poland and Slovakia can also expect a significant loss in potential output. Slovenia, Hungary and the Czech Republic have seen little emigration, and the impacts in these economies can be expected to be small.

The impact of outflows from the EU-2 economies have had very damaging effects on the level of potential output in the sending countries, with GDP in Bulgaria expected to be more than 5 per cent below where it would have been in the absence of emigration and the output loss in Romania nearly double that. The biggest impacts on the receiving countries have been in Italy and Spain, with the level of output in Italy up 1.1-1.4 per cent and that in Spain up 1.4-2 per cent.

**Table 3.25. Long-run impact on output before and after productivity adjustment
 EU-2 migration to EU-15 countries**

| | Long-run impact on GDP | | | |
|-----------------|------------------------|----------------|----------------|----------------|
| | Age adjusted | Productivity 1 | Productivity 2 | Productivity 3 |
| Bulgaria | -5.35 | -5.34 | -5.34 | -5.33 |
| Romania | -10.57 | -10.52 | -10.52 | -10.70 |
| EU-2 | -9.43 | -9.40 | -9.40 | -9.53 |
| Belgium | 0.29 | 0.29 | 0.34 | 0.23 |
| Denmark | 0.11 | 0.11 | 0.13 | 0.08 |
| Finland | -0.06 | -0.06 | -0.06 | -0.06 |
| France | 0.09 | 0.10 | 0.12 | 0.08 |
| Germany | 0.05 | 0.05 | 0.04 | 0.03 |
| Greece | 0.62 | 0.60 | 0.45 | 0.37 |
| Ireland | 0.28 | 0.29 | 0.28 | 0.18 |
| Italy | 1.28 | 1.33 | 1.37 | 1.08 |
| Neths | 0.09 | 0.09 | 0.10 | 0.06 |
| Austria | 0.46 | 0.48 | 0.51 | 0.36 |
| Portugal | 0.25 | 0.26 | 0.26 | 0.23 |
| Sweden | 0.04 | 0.04 | 0.07 | 0.03 |
| Spain | 1.68 | 1.72 | 1.96 | 1.35 |
| UK | 0.17 | 0.16 | 0.17 | 0.13 |
| EU-15 | 0.44 | 0.45 | 0.49 | 0.36 |

Source: NiGEM Model simulation exercises

Table 3.26. Long-run impact on GDP per capita before and after productivity adjustment EU-2 migration to EU-15 countries

| | Long-run impact on GDP per capita | | | |
|-----------------|-----------------------------------|----------------|----------------|----------------|
| | Age adjusted | Productivity 1 | Productivity 2 | Productivity 3 |
| Bulgaria | -1.70 | -1.68 | -1.68 | -1.68 |
| Romania | -3.11 | -3.06 | -3.06 | -3.25 |
| EU-2 | -2.96 | -2.92 | -2.92 | -3.07 |
| Belgium | 0.05 | 0.05 | 0.10 | -0.02 |
| Denmark | 0.01 | 0.01 | 0.02 | -0.03 |
| Finland | -0.08 | -0.08 | -0.08 | -0.08 |
| France | 0.02 | 0.02 | 0.04 | 0.01 |
| Germany | -0.01 | -0.01 | -0.02 | -0.03 |
| Greece | 0.09 | 0.07 | -0.08 | -0.16 |
| Ireland | 0.00 | -0.01 | -0.02 | -0.12 |
| Italy | 0.05 | 0.11 | 0.15 | -0.14 |
| Neths | 0.00 | 0.00 | 0.01 | -0.03 |
| Austria | 0.02 | 0.02 | 0.05 | -0.09 |
| Portugal | 0.03 | 0.04 | 0.03 | 0.00 |
| Sweden | -0.05 | -0.05 | -0.01 | -0.06 |
| Spain | 0.14 | 0.12 | 0.37 | -0.24 |
| UK | 0.04 | 0.03 | 0.03 | -0.01 |
| EU-15 | -0.03 | -0.01 | 0.02 | -0.11 |

Source: NiGEM Model simulation exercises

3.4.3 Adjusting for remittances

Remittances also have a role to play in determining the impact of migration on both the home and host economies. Sending countries tend to benefit from remittances, which are sent back by workers to their families and boost private consumption, and this may partially offset the loss of productive capacity and potentially a decline in average productivity in the short-run. Remittances are not expected to have a permanent or long-run impact on output, as they do not shift the productive capacity of the economy. However, they may alter the composition of demand, toward domestic demand and away from net trade. They generally reflect a loss to the host country in the short-run, as consumption is lowered and the fiscal contribution of foreigners through indirect taxes decreases. The level of remittances has increased significantly to all EU-8 and EU-2 countries since accession. In particular the EU-2 countries have been benefiting from a high level of remittances.

Within the NiGEM modelling framework adopted for this study, we can directly adjust for remittances in Poland, Hungary and the Czech Republic, but not the other countries covered by this report. In table 3.27 below we report the remittances sent to these three countries over our sample period. These include remittances sent from all over the world, but for the purposes of our analysis we will assume that all remittances are sent from the EU-15 economies, which host the vast majority of migrants from these three countries. This may add an upward bias to our estimates of the impact of remittances in relation to EU expansion.

Table 3.27 Remittances, US\$ Million

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|----------------|------|------|------|-------|-------|------|
| Czech Republic | 815 | 1026 | 1190 | 1332 | 1360 | 1201 |
| Hungary | 1717 | 1931 | 2079 | 2311 | 2509 | 2130 |
| Poland | 4728 | 6482 | 8496 | 10496 | 10447 | 8126 |

Source: World Bank

In order to capture the impact of remittances within our scenario, we assume remittances are split evenly between current income and saved income through a rise in financial assets. We raise the level of personal sector income by half the values reported in the table in each of the six years, with the remainder added to the stock of financial wealth. At the same time we reduce the level of personal sector income in the EU-15 countries by the same amount. This amount is distributed across countries according to their share of the total stock of citizens of the relevant country residing in the EU-15. Table 3.28 below reports the impact on GDP and GDP per capita by 2009 of age-adjusted migration from the EU-8 to the EU-15 between 2004 and 2009, after allowing for remittances sent to Poland, Hungary and the Czech Republic. The figures are compared to the impact excluding remittances. In both cases we adjust for the age profile of migrants, but not expected productivity, as we have no clear preference for one of the three productivity scenarios discussed in the previous section. We report the impact as of 2009 rather than the long-run impact, as remittances are not expected to shift the productive capacity of the economy, but affect demand in the short- to medium-run.

Our results suggest that remittances have a significant positive impact on the home countries (Poland, Hungary and the Czech Republic), but only a marginal impact on the host countries, as the effects are spread across 15 countries and the buying power of a given sum is smaller in the EU-15 than in Poland, Hungary or the Czech Republic. We would expect an even greater positive impact on output in Bulgaria and Romania once remittances are taken into account, given the magnitude of remittances to these countries relative to the size of their GDP. The impact on the EU-15, however, would remain small. The sum of remittances to Bulgaria and Romania has

been smaller than those to Poland since 2004 (although higher as a share of GDP, as shown in the Bulgarian case study).

Table 3.28. Impact on GDP and GDP per capita by 2009, with and without remittances (EU-8 migration to EU-15 countries)

| | Cumulative impact on GDP by 2009 | | Cumulative impact on GDP per capita by 2009 | |
|------------------|----------------------------------|------------------|---------------------------------------------|------------------|
| | Without remittances | With remittances | Without remittances | With remittances |
| Czech Rep | -0.06 | 0.10 | 0.23 | 0.40 |
| Hungary | -0.05 | 0.51 | 0.54 | 1.11 |
| Poland | -0.41 | 0.64 | 2.09 | 3.13 |
| Belgium | 0.23 | 0.27 | -0.08 | -0.04 |
| Denmark | 0.34 | 0.31 | -0.10 | -0.13 |
| Finland | 0.08 | 0.07 | -0.21 | -0.21 |
| France | 0.09 | 0.08 | 0.07 | 0.06 |
| Germany | 0.05 | -0.02 | -0.12 | -0.18 |
| Greece | 0.16 | 0.06 | 0.12 | 0.01 |
| Ireland | 1.75 | 1.63 | -1.55 | -1.66 |
| Italy | 0.10 | 0.04 | -0.04 | -0.09 |
| Neths | 0.18 | 0.15 | -0.10 | -0.13 |
| Austria | 0.22 | 0.02 | -0.15 | -0.35 |
| Portugal | 0.11 | 0.06 | 0.09 | 0.04 |
| Sweden | 0.14 | 0.13 | -0.26 | -0.27 |
| Spain | 0.14 | 0.06 | -0.07 | -0.15 |
| UK | 0.94 | 0.86 | -0.14 | -0.23 |
| EU-15 | 0.28 | 0.23 | -0.06 | -0.12 |

Source: NiGEM Model simulation exercises

3.5 Quantifying the impact of the EU enlargements¹⁰

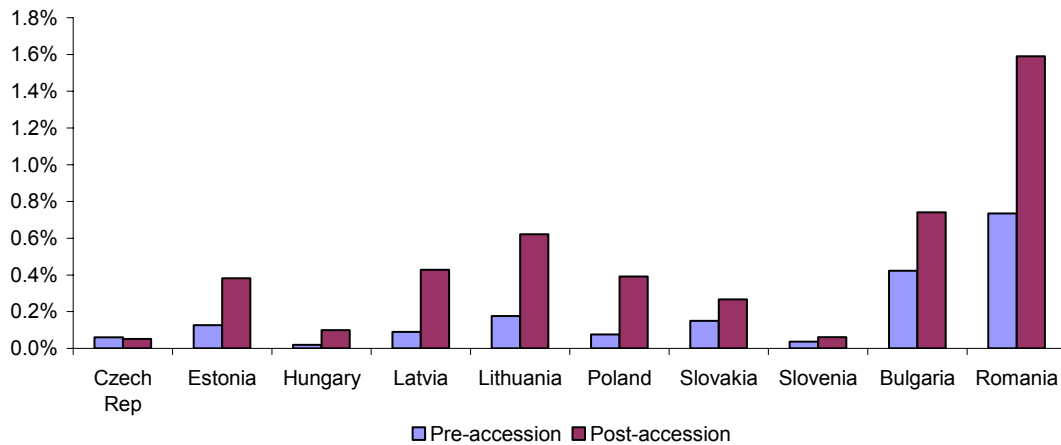
Our baseline estimates reported above report estimates of the macro-economic impact of population shifts between the EU-8/EU-2 and EU-15 since 2004 under a very simple set of assumptions. However, we have not yet attempted to quantify the share of this impact that can be attributed to the enlargement of the EU in either 2004 or 2007. As our migrant stock matrix shows, there was a pre-existing stock of EU-8 and EU-2 citizens in each of the EU-15 economies prior to the enlargements, and these stocks had predominantly been rising over time. It is likely that net inflows to the EU-15 would have continued for some time given the opportunity for higher wages and in some cases employment opportunities in the EU-15 relative to the home economies, even in the absence of freer access to EU-15 labour markets following accession.

In order to quantify the macro-economic impact of the population movements directly related to the EU enlargements, we must establish a counter-factual scenario describing the population flows that might have occurred in the absence of the

¹⁰ Any comments or queries related to section 3.5 of the report can be addressed to Dawn Holland (d.holland@niesr.ac.uk).

enlargements. One simple approach is to assume that the emigration from the EU-8/EU-2 would have continued at the same rate as in the preceding years. This approach was adopted for the counter-factual analysis reported by Baas, Brucker, Hauptmann and Jahn (2007) and also by Barrell *et al* (2009). Figure 3.21 below illustrates the average rate of emigration (relative to the domestic population) in the 5 years prior to accession (1999-2003 for the EU-8 and 2002-2006 for the EU-2), compared to the average emigration rate since accession (2004-2009 for the EU-8 and 2007-2009 for the EU-9).

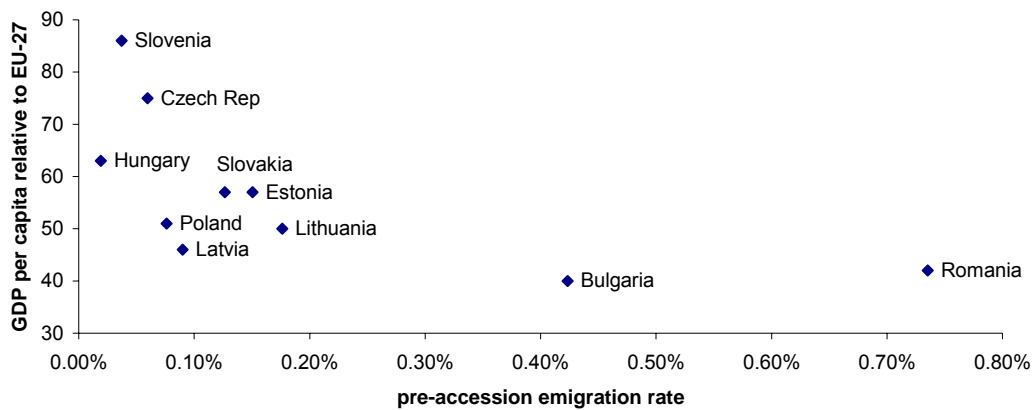
Figure 3.21. Average annual emigration rates to the EU-15



Source: Derived from Table 3.2 and Eurostat population statistics

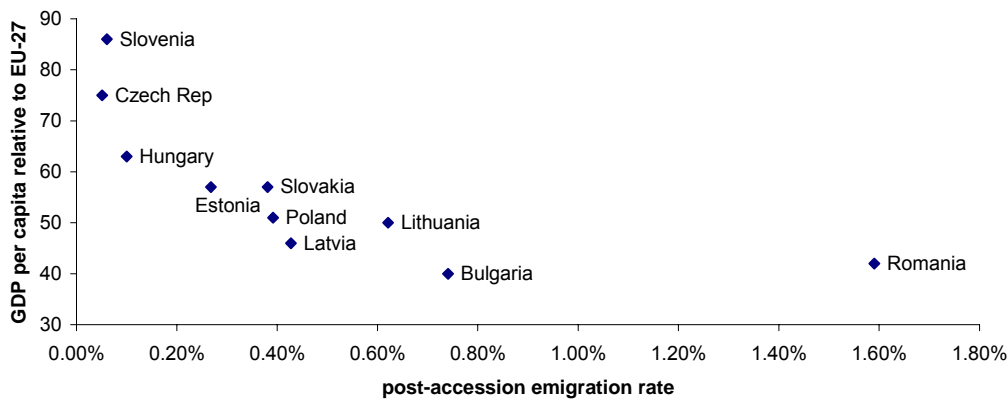
In most countries there has been a clear rise in the average emigration rate to the EU-15 since acceding to the EU. The impact in the Czech Republic and Slovenia is very small, where emigration rates are already very low. This may reflect the relatively high standards of living in these countries, which raises the costs of emigration. The propensity to emigrate towards the EU-15 shows a strong correlation with relative GDP per capita. Figures 3.22-3.23 below plot the pre-accession and post-accession emigration rates against GDP per capita in the year of accession relative to the EU-27 average. Romania is a clear outlier in both figures, showing a much higher propensity to emigrate towards the EU-15 than the other countries, given its relative GDP per capita.

Figure 3.22. Pre-accession annual emigration rate and relative GDP per capita



Source: Figure 3.21 and Eurostat GDP per capita

Figure 3.23. Post-accession annual emigration rate and relative GDP per capita



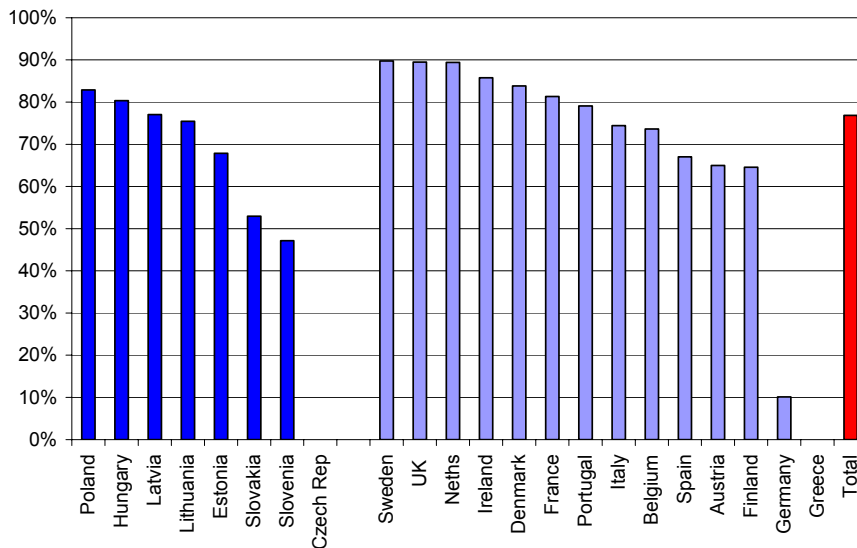
Source: Figure 3.21 and Eurostat GDP per capita

Based on the information presented above, we assume that accession to the EU had no impact on emigration from the Czech Republic and Slovenia to the EU-15. For the remaining countries, we assume that the share of migration since accession over and above the average emigration rate in the five years prior to accession is attributable to the accession process itself. This approach suggests that about 75 per cent of the population flows from the EU-8 since 2004, while just over 50 per cent of flows from the EU-2 since 2007 can be attributed to accession.

The impacts across both sending and receiving countries show stark differences. We see no rise in population flows from the EU-8 to Greece that can be attributed to the enlargement process, while only 10 per cent of population flows to Germany since 2004 can be attributed to the enlargement, compared to close to 90 per cent in the UK, Sweden and the Netherlands. More than 80 per cent of population outflows from Poland and Hungary are attributed to enlargement, compared to less than 50 per cent

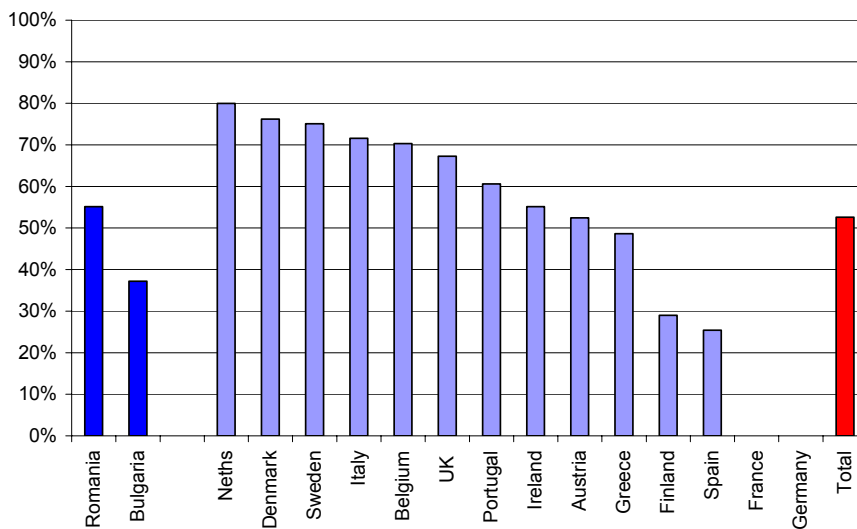
from Slovenia. We see no evidence that the 2007 enlargement affected population flows from the EU-2 to France or Germany, while more than 75 per cent of flows from the EU-2 to Sweden, the Netherlands and Denmark since 2007 can be attributed to the 2007 enlargement.

Figure 3.24. Share of population shifts from EU-8 to EU-15 2004-2009, attributed to 2004 enlargement (in %)



Source: Own calculations

Figure 3.25. Share of population shifts from EU-2 to EU-15 2007-2009, attributed to 2007 enlargement (in %)



Source: Own calculations

3.6 Estimates of the impact of transitional arrangements on migration¹¹

This section quantifies the impact of transitional arrangements on migration flows, and subsequently, the real economy. The two enlargement waves, 2004 and 2007, are dealt with separately to identify potential idiosyncrasies both across the sample period as well as across individual countries. We develop a simple model of the location decision, in order to produce a more accurate assessment of the role of transitional arrangements in the location decision, after factoring out macro-economic and demographic developments.

3.6.1 EU-8

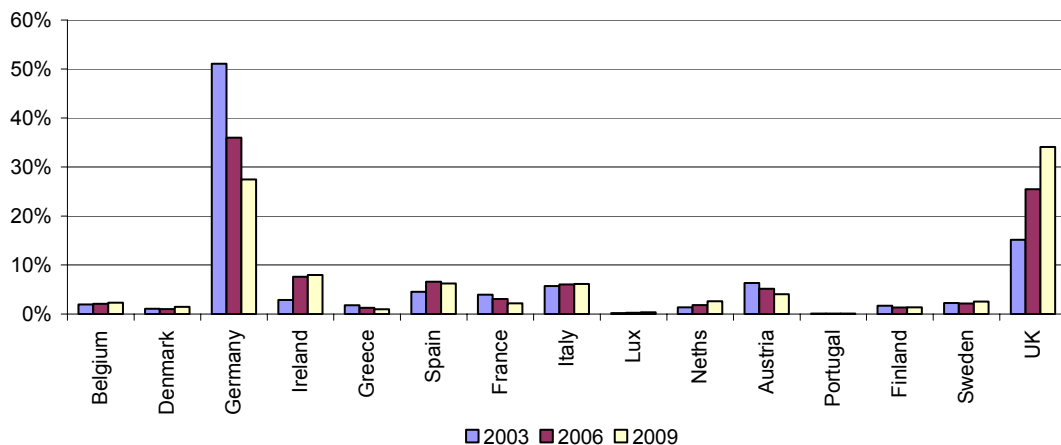
The analysis reported above highlights vast discrepancies in the share of population shifts attributable to the accession process across countries. For example, only 10 per cent in migration towards Germany since 2004 can be attributed to EU enlargement, whereas closer to 90 per cent of inward migration from the EU-8 to the UK is unlikely to have occurred in the absence of EU enlargement. There have clearly been significant shifts in the share of migrants from the EU-8 and EU-2 going to individual EU-15 countries. Most studies have found that an existing network or diaspora is the most important factor driving the destination decision of migrants (see for example Delbecq and Waldorf, 2010; Pedersen *et al*, 2008. Mayda, 2007 also finds an important role.) so all else equal, we would expect the distribution of EU-8 citizens across the EU-15 economies to remain largely constant over time. The distributional shifts that have occurred have been widely attributed to the differences in transitional arrangements across the EU-15 countries, with some countries maintaining restrictions on free mobility longer than others.

Figure 3.26 below illustrates the share of EU-8 citizens resident in each of the EU-15 economies in 2003 (just prior to the 2004 enlargement), in 2006 (at the end of the first stage of the transitional arrangements), and in 2009 (at the end of the second stage of the transitional arrangements). The most striking changes are in Germany and the UK. In 2003, just over 50 per cent of EU-8 citizens resident in the EU-15 were located in Germany, whereas by 2009 this share had fallen to less than 30 per cent. Over the same period the share of EU-8 citizens resident in the UK rose from about 15 per cent to over 35 per cent, overtaking Germany as the primary destination. As the UK was one of the few countries not to introduce transitional restrictions on the free mobility of labour from the EU-8, there would appear to be a clear link between these factors. Ireland, which along with Sweden was the only other country not to impose temporary restrictions on labour mobility, also exhibits a strong rise in its share.

¹¹ Any comments or queries related to section 3.6 of the report can be addressed to Dawn Holland (d.holland@niesr.ac.uk).

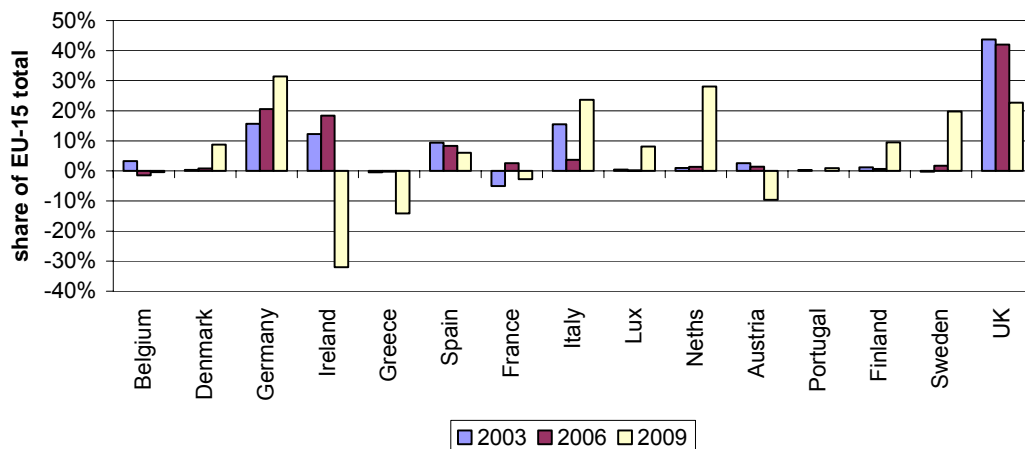
As we showed above, given the size of the country in percentage terms the population shock in Ireland was far bigger than in any of the other EU-15 countries. Despite the ease of access to the Swedish labour market, there was little shift in the share of EU-8 citizens resident in Sweden over this period, suggesting that the transitional arrangements cannot fully explain the changes we see. Transitional arrangements were lifted in Greece, Spain, Italy, Portugal and Finland in 2006, at the end of the first phase of the transitional arrangements. If the transitional restrictions prevented labour mobility to these countries during the first phase of the arrangements, we would expect to see some recovery in their shares in the second phase. However, there is not a clear rise in share in any of these countries between 2006 and 2009.

Figure 3.26. Distribution of EU-8 citizens resident in the EU-15 across destination countries in 2003, 2006 and 2009



Source: Derived from Table 3.2

Figure 3.27. Distribution of net flows of EU-8 citizens to the EU-15 across destination countries in 2003, 2006 and 2009



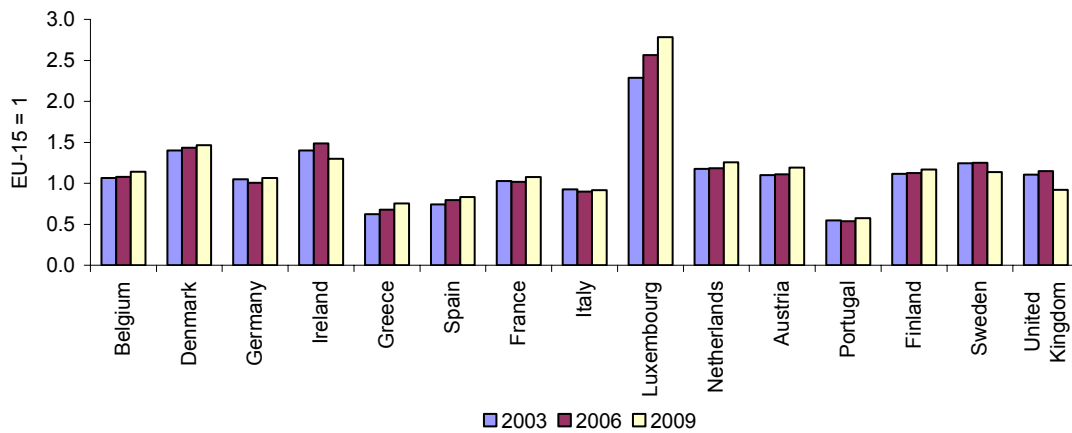
Source: Derived from Table 3.2

Figure 3.27 illustrates the distribution of flows of migrants from the EU-8 to the EU-15 across destination countries over the same period. It is interesting to note that the share of flows to the UK had already overtaken that of Germany before 2004. The UK received the highest inflows from the EU-8 economies in both 2002 and 2003, suggesting that the distributional shift was already an ongoing process, and we cannot attribute all of this shift to the presence of transitional restrictions.

Other factors that have been found to affect the location decision include employment opportunities, captured by variables such as the unemployment rate relative to elsewhere, and the earnings potential, captured for example by GDP per capita relative to elsewhere. Figures 3.28-3.29 illustrate the unemployment rates¹² and GDP per capita in each of the EU-15 economies relative to the EU-15 average in 2003, 2006 and 2009, to see if these can explain any of the unexplained shifts in the distribution of EU-8 citizens across the EU-15 over this period.

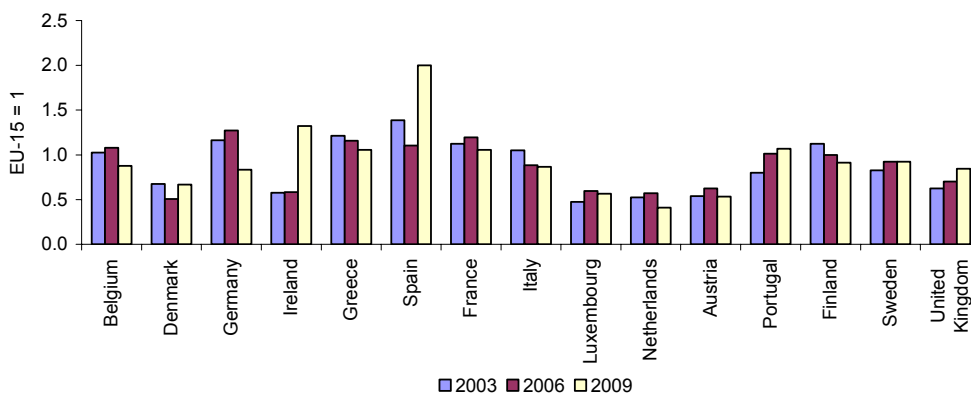
¹² We considered job vacancies as an alternative to the unemployment rate in the countries for which this data is available (Belgium, Germany, Greece, Spain, Luxembourg, Netherlands, Portugal, Finland, Sweden, UK). Vacancies were highest in Germany over most of the period, and do little to explain the pattern of migration.

Figure 3.28. GDP per capita relative to the EU-15 average in 2003, 2006, 2009



Source: Derived from Eurostat figures

Figure 3.29. Unemployment rate relative to the EU-15 average in 2003, 2006, 2009



Source: Derived from Eurostat figures

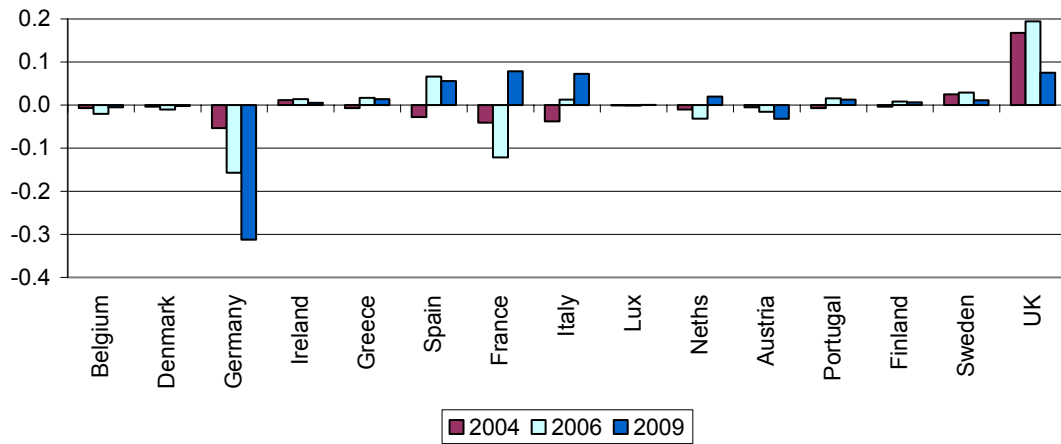
GDP per capita in Ireland and Denmark was higher than in Germany over this sample period, although in Ireland GDP per capita declined significantly between 2006 and 2009 relative to the EU-15 average. The unemployment rate in Ireland, Denmark and the UK was low over most of the sample period relative to Germany, and these factors may be partly related to the shift in location share from Germany towards these alternative destination countries.

In order to assess the likely impact of the transitional arrangements on the distribution of EU-8 citizens across the EU-15, we constructed a simple index to illustrate the degree of mobility restrictions in the host country compared to the EU average. The index gives a value of 1 where no restrictions are present, and a value of -1 where restrictions are present (and a weighted average of the two when restrictions were lifted part-way through the year). The average value across the 15 countries is calculated for the year, and a relative figure is calculated as the absolute difference between the host country value and the EU-15 average value in the given year. This

value is then multiplied by the EU-15 population share of the destination country, to account for the fact that larger countries, such as the UK, can absorb a higher level of immigrants than smaller countries, such as Ireland, for a given level of restriction.

This approach ensures that a host country is more attractive if it is one of few destinations that do not impose restrictions, while it becomes less attractive if it is one of few countries that continue to impose restrictions. This simple index does not take into account the complexities of situations in individual economies, as some restrictions are more binding or more stringent than others, but provides a useful estimate of the relative openness of the labour markets in each country. The constructed measure is illustrated in figure 3.30.

Figure 3.30. Restrictions on mobility from the EU-8 relative to the EU-15 average (population adjusted)



Source: Own calculations

Germany and Austria become increasingly less attractive destinations over time, as other countries lift restrictions on mobility. The UK in particular is highly attractive in 2004 and 2006, but relatively less attractive once other countries begin to lift their restrictions. As of 1 May 2011 the value of our restriction index fell to 0 in all countries, as the final restrictions on mobility from the EU-8 were lifted.

We ran a simple panel regression to assess the correlation between our relative restriction index and the change in share of EU-8 migrants in each of the EU-15 host countries, after factoring out the impact of other key variables. The estimated equation can be described as follows:

$$\Delta migsh_{it} = \alpha_1 \Delta popsh_{it} + \alpha_2 relycap_{it} + \alpha_3 relu_{it} + \alpha_4 relrestr_{it} + \varepsilon_{it}^{13}$$

¹³ In an extension to this preliminary exercise it would be interesting to re-estimate the relationship, imposing a unit coefficient on *popsh*, and to test the results for sensitivity to the inclusion/exclusion of individual countries in the sample.

where:

t is the time operator, i is the EU-15 destination country, Δ is the absolute change operator and:

$migsh$ is the share of country i , within EU-15, of resident EU-8 citizens,
 $popsh$ is the share of country i , within EU-15, of resident EU-15 citizens,
 $relycap$ is GDP per capita in country i , relative to the EU-15 average,
 $relu$ is the unemployment rate in country i , relative to the EU-15 average,
 $relrestr$ is the above index on relative restrictions on mobility.

The sample period runs from 2004-2009, for a panel of 15 countries, giving a total of 90 observations.

The equation is designed so that if the population of the destination is growing relative to the rest of the EU, that country will attract an increasing share of new migrants. If GDP per capita is above the EU-15 average, the destination country can be expected to gain share each year, while if the unemployment rate is high relative to the average the destination country can be expected to lose share each year. These shifts in share would be expected to be permanent, reflecting the network effects on destination choice. Similarly, if labour market restrictions are low relative to other potential destinations, the country can be expected to gain share on a permanent basis.

The results of this simple estimation procedure are reported below (t-statistics are reported below the coefficient estimates):

$$\Delta migsh_{it} = 15.2 \Delta popsh_{it} + 0.43 relycap_{it} - 0.27 \alpha_3 relu_{it} + 0.045 relrestr_{it}$$

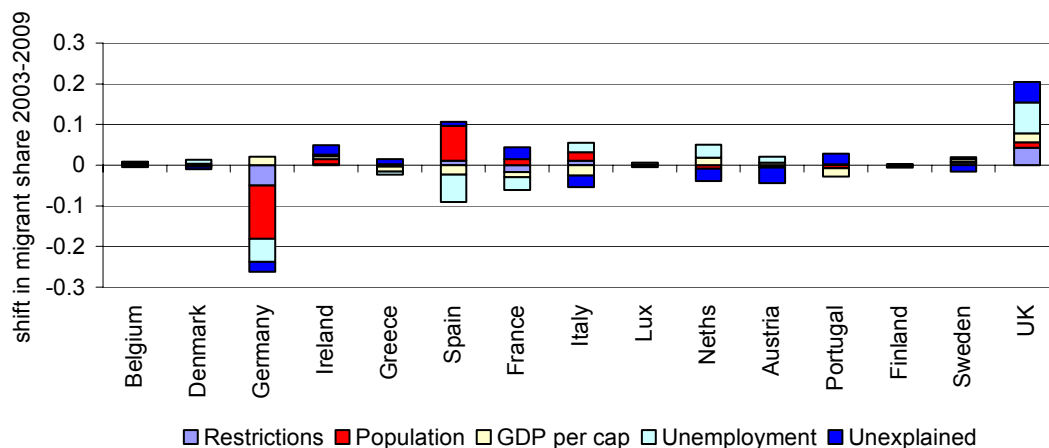
_{3.9}
_{1.6}
_{4.5}
_{2.2}

All parameters in the estimation results are correctly signed, although relative GDP per capita is not significant at the 5 per cent level. Our equation can explain over 50 per cent of the share shifts over this period. The point estimates of the results suggest that if the UK lifts restrictions on mobility while the other 14 retain restrictions, the share of EU-8 citizens resident in that country can be expected to increase by about 1.2 percentage points per annum. Our econometric work suggests that the transitional arrangements can only partially explain the 20 percentage point increase in the EU-8 migrant share in the UK over the six year period to 2009.

Figure 3.31 below illustrates the results of the econometric estimates graphically. We disaggregate the total shift in the share of migrants from the EU-8 countries resident in the EU-15 economies that occurred between 2003 and 2009 into the fraction that can be explained by the transitional restrictions, the fraction that can be explained by population developments, the fraction attributable to relative GDP per capita, the part attributable to relative unemployment rates and the remainder of the shift in share, that cannot be explained by our simple model. It is interesting to note that our model suggests that population developments play a relatively large role in explaining the

loss of share in Germany in comparison to the transitional restrictions, while a low unemployment rate in the UK played a relatively bigger role in attracting inward migrants than the ease of access to the labour market. Nonetheless, the transitional restrictions continue to explain roughly 20 per cent of the shifts in share between 2003 and 2009 in the UK and Germany.

Figure 3.31. Sources of migrant share shifts from EU-8, 2003-2009



Source: Own calculations based on estimated equation, calibrated restrictions index in figure 3.30, Eurostat data on GDP per capita, unemployment rates and total population.

We use the information from the figure above to calibrate the impact of the transitional arrangements on the population shocks in the receiving countries, and run a model simulation to illustrate the macro-economic impact of these restrictions¹⁴. We would consider this to be a lower bound of the estimated impact of the transitional arrangements, as there remains a significant residual category in each country that cannot be explained by the simple model. It is possible that this partly reflects more refined distinctions between the types of labour market restrictions across countries that our simple index cannot capture. However, our estimates suggest that some earlier studies may have overestimated the role of transitional arrangement in the location decision, as they have not adequately accounted for some of the more traditional factors driving the location decision.

Table 3.29 below reports our estimates of the impact of transitional arrangements in place following the 2004 enlargement on the long-run level of GDP in each of the EU-15 economies and compares this to the total impact of the 2004 EU enlargement on output, as well as the impact of total population flows (including those that cannot

¹⁴ It is possible that the transitional arrangements themselves have restrained the overall level of mobility from the EU-8 to the EU-15, as suggested by Brucker et al (2007). However, their estimates of this impact are very small in magnitude, and given the small magnitudes of the macro-economic impact overall we omit this potential source of bias in our calculations.

be attributed to the enlargement process itself) from the EU-8 to the EU-15 over the period 2004-2009. The impact of the 2004 enlargement is calculated as the impact of total population flows, adjusted by the share attributable to enlargement, as reported in figure 3.24 above. We adjust for the age structure of migrants, but not for productivity levels, as we do not have a clear preference for one of the three productivity scenarios we presented above.

The enlargement process itself raised the level of potential output in all the EU-15 economies with the exception of Greece. However, except in the cases of the UK and Ireland the estimated impacts were small. Our estimates suggest that the population flows associated with enlargement have raised the level of output in Ireland by about 3 per cent and in the UK by just over 1 per cent. The transitional arrangements diverted some population flows away from Belgium, Denmark, Finland, France, Germany and Austria, towards the other EU-15 economies. However, the estimated impact of these restrictions on output is small, with the biggest impact of 0.15 per cent on the level of GDP in the UK.

Our results throw some doubt on the importance of the restrictions in the location decision of migrants. While we have observed a clear shift in the distribution of EU-8 citizens across the EU-15, this shift was already ongoing prior to the 2004 enlargement, and can be explained to a large extent by differences in the macro-economic developments within the potential destination countries.

Table 3.29. Long-run impact on GDP of 2004 enlargement and transitional restrictions

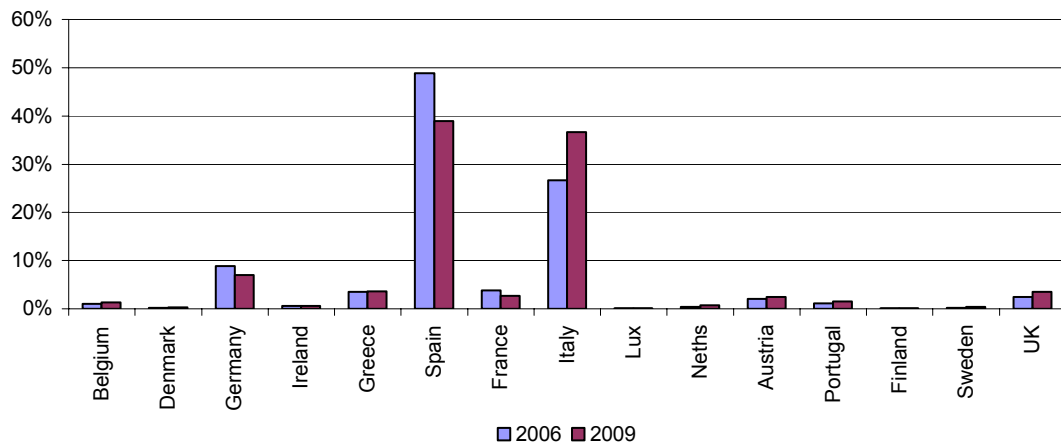
| | Age adjusted population flows 2004-2009 from the EU-8 | Of which attributable to 2004 enlargement | Impact of transitional restrictions |
|----------|-------------------------------------------------------|-------------------------------------------|-------------------------------------|
| Belgium | 0.36 | 0.27 | -0.09 |
| Denmark | 0.56 | 0.47 | -0.11 |
| Finland | 0.24 | 0.16 | -0.01 |
| France | 0.04 | 0.03 | -0.03 |
| Germany | 0.19 | 0.02 | -0.11 |
| Greece | 0.08 | 0.00 | 0.08 |
| Ireland | 3.02 | 2.58 | 0.13 |
| Italy | 0.15 | 0.11 | 0.03 |
| Neths | 0.31 | 0.28 | 0.01 |
| Austria | 0.39 | 0.25 | -0.13 |
| Portugal | 0.06 | 0.05 | 0.08 |
| Sweden | 0.37 | 0.33 | 0.12 |
| Spain | 0.21 | 0.14 | 0.03 |
| UK | 1.24 | 1.11 | 0.15 |

Source: Age adjusted impact from Table 3.18; enlargement adjustment from figure 3.24; NiGEM model simulation exercise

3.6.2 EU-2

The sample period for the 2007 enlargement is too short to produce a separate econometric analysis. However, we can apply the same model estimated above to the distribution shifts of EU-2 citizens across the EU-15 to see if it can capture part of the developments we have observed. Figure 3.32 illustrates the distribution of EU-2 citizens across the EU-15 countries in 2006, just prior to their accession to the EU, and in 2009, at the end of the first phase of the transitional arrangements. Nearly 80 per cent of EU-2 citizens in the EU-15 reside in either Spain or Italy. The share residing in Spain declined significantly between 2006 and 2009, while the share in Italy rose by a similar magnitude.

Figure 3.32. Distribution of EU-2 citizens resident in the EU-15 across destination countries



Source: Derived from Table 3.2

We calibrate a relative restrictions index for the EU-2 in the same way as for the EU-8 discussed above. This is illustrated in figure 3.33. Only Finland and Sweden allowed completely free access to their labour markets for citizens from Bulgaria and Romania in 2007, neither of which are traditional destinations for migrants from the EU-2 countries. Denmark, Greece, Spain and Portugal allowed free access in 2009.

Figure 3.33. Restrictions on mobility from the EU-2 to the EU-15 average (population adjusted)



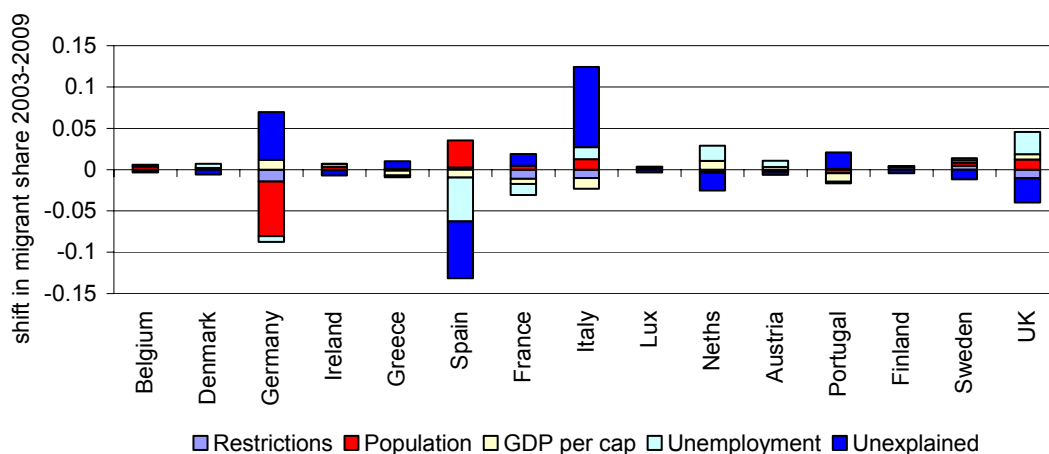
Source: Own calculations

It is not clear that the restrictions on labour market access through transitional arrangements had a significant impact on the location decision of migrants from the EU-2 in the same way as they did following the 2004 enlargement. To some extent this may reflect the simple construction method of our relative restrictions index, which only distinguishes between the presence and absence of restrictions. A more nuanced study would want to consider the type of restrictions in place and other

institutions that may encourage or discourage immigration. For example, in the case of Italy work permits are not required for EU-2 citizens to work in many sectors, such as domestic work and care services, construction, and seasonal work, which may partly explain its popularity as a destination.

In figure 3.34 we disaggregate the total shift in the share of migrants from the EU-2 countries resident in the EU-15 economies that occurred between 2006 and 2009 into the fraction that can be explained by the transitional restrictions (as captured by the index illustrated in figure 3.33), the fraction that can be explained by population developments, the fraction attributable to relative GDP per capita, the part attributable to relative unemployment rates and the remainder of the shift in share, that cannot be explained by our simple model. The bulk of the shift in share between Spain and Italy remains unexplained by our simple model, and there are clearly factors in addition to the key macro-economic developments and the ease of access to the labour markets that have determined the location decision of EU-2 mobile workers. These may include cultural and linguistic factors, which are likely, in particular, to make Italy and Spain attractive locations for Romanians.

Figure 3.34. Sources of migrant share shifts from EU-2, 2006-2009



Source: Own calculations based on estimated equation, calibrated restrictions index in figure 3.33, Eurostat data on GDP per capita, unemployment rates and total population.

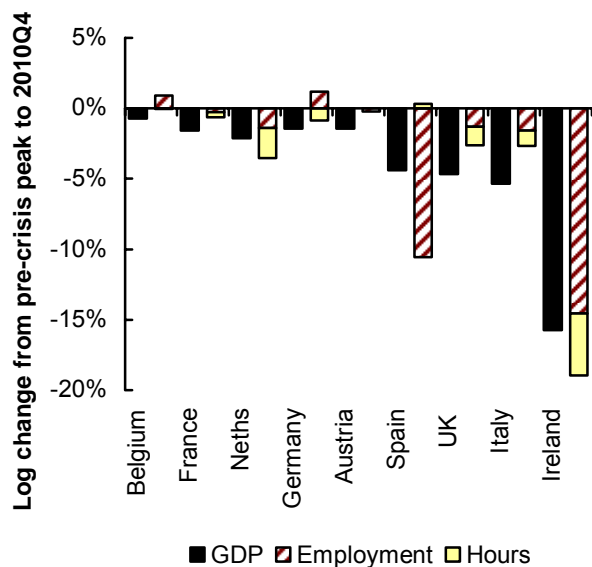
3.6.3 Prospects for transitional arrangements 2012-2013

From 1 May 2011, citizens of the EU-10 countries have full access to labour markets across the EU-27, as the final transitional arrangements were lifted at the end of the 7 year transitional period, and Bulgaria and Romania have not imposed any restrictions on access. As of June 2011, workers from the EU-2 still face some restrictions on access to labour markets in Belgium, Germany, Ireland, France, Italy, Luxembourg,

the Netherlands, Austria, the UK and Malta. The second phase of the transitional arrangements for the 2007 enlargement will come to an end on 31 December 2011, at which point the governments of these countries will have to decide whether or not to extend the restrictions for a further two years. In principle, restrictions can only be extended during the final phase if the country is facing a ‘serious disturbance of its labour market or a threat thereof’. However, in practice there is no agreed definition of what constitutes a serious disturbance of the labour market. In particular it is unclear whether the disturbance should be directly related to an actual or expected increase in immigration. As shown above, it would be difficult for any receiving country to argue that past migration from the EU-8 or EU-2 had a strong negative effect on their labour market. Below we will consider whether EU-15 countries still restricting access of EU-2 workers can argue that they face some disturbances of their labour markets (not necessarily related to migration).

While we acknowledge that the decision to prolong transitional restrictions into the final phase of the transition may be as much political as it is economic, in figure 3.35 we illustrate the residual gap in GDP and labour input (total employment adjusted by average hours worked per employee) since the onset of the global financial crisis. This can help to identify where serious labour market disturbances may exist – albeit these disturbance are more likely to be related to the global financial crisis than immigration. The figure includes all the countries that retain labour market restrictions on citizens from Bulgaria and Romania (with the exceptions of Malta and Luxembourg). We also include Spain, although this country has already lifted labour market restrictions, as it is one of the countries that have suffered the most from the downturn. Ireland stands out clearly in the figure. Labour input remains nearly 20 per cent below its level in mid-2008. There is clearly a severe disturbance to the labour market in Ireland, and we could expect the restrictions in place to remain until 2013 in this country due to this significant 'disturbance of the labour market'. From these simple macro-level figures it would be difficult to identify a significant disturbance in Belgium, France, Germany or Austria. However, given the precedent of the 2004 enlargement, Germany and Austria may opt to retain their labour market restrictions for a further two years. This decision is likely to be influenced by any labour market impact of new migration flows from the EU-8 since May 2011, after the final transition restrictions on these countries was lifted. If the outturn proves more favourable than the government had feared, this may encourage them to lift restrictions on access for citizens from the EU-2. UK, Italy and, to a certain extent the Netherlands could argue that their labour markets have yet to recover from the economic downturn, but again their decision is unlikely to be based on the estimated labour market impact of immigration, which we have shown to be small, but on the slow recovery from the economic crisis.

Figure 3.35. Change in GDP and labour input from pre-crisis peak



Source: Derived from NiGEM database series

3.7 Estimates of the impact of the financial crisis on migration¹⁵

Net emigration from the EU-2 and especially the EU-8 to the EU-15 slowed sharply in 2008 and 2009. To some extent this may reflect the end of the impact of EU accession on migration flows, especially from the EU-8, as pent-up demand for emigration from these economies can be expected to have largely cleared after 4-5 years of EU membership, despite the persistence of certain restrictions on labour mobility in the traditional destinations of Germany and Austria. However, there is also evidence to suggest that this slowdown partly reflects the relative severity of the global financial crisis on the EU-15 labour markets and the macro-economy compared to those in some of the home economies.

We take a simple approach to estimate the impact of the recession on migration flows. We assumed that the average emigration rate of each of the EU-8 and EU-2 economies in 2007 would have persisted in 2008 and 2009 in the absence of the global recession to calibrate the total impact on net flows to the EU-15. We then use the model developed in the previous section to look at the impact of GDP and unemployment developments in the individual EU-15 economies to determine the distribution of flows across countries. Table 3.30 below reports our estimated impact

¹⁵ Any comments or queries related to section 3.7 of the report can be addressed to Dawn Holland (d.holland@niesr.ac.uk).

of the global recession on population flows from the EU-8 and EU-2 economies. This should be viewed as an upper bound to the estimated impact for the EU-8, as part of the slowdown in the emigration rates in 2008-2009 may reflect the exhaustion of pent-up labour migration from these economies, which have had access to at least some of the EU-15 labour markets since 2004.

Except in the case of Latvia, the emigration rate in all the countries slowed in 2008-2009. The biggest impacts in percentage terms were in the Czech Republic, and Slovakia. Overall, we estimate that migration flows from the EU-8 economies in 2008 and 2009 were 67 per cent lower than they might have been in the absence of the global recession, while flows from the EU-2 were about 50 per cent reduced. Outflows from Latvia appear to have been higher in 2008 and 2009 than would have otherwise been expected. This may be a reflection of the exceedingly sharp downturn in Latvia, where GDP declined by 3.9 per cent in 2008 and 17.9 per cent in 2009, the biggest cumulative output loss in the EU. This drove the unemployment rate in Latvia up to nearly 20 per cent by the end of 2009.

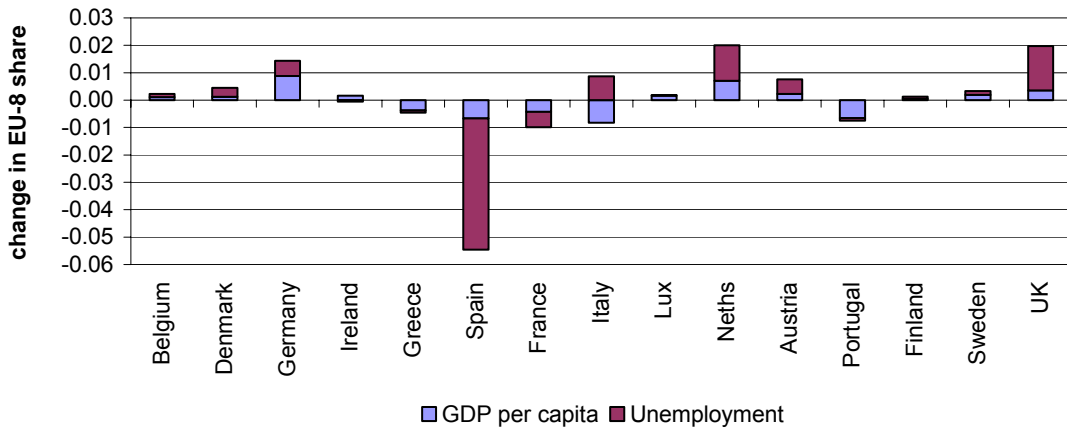
Table 3.30. Impact of recession on net population flows to EU-15 countries (in the period 2008-09)

| | Impact on net migration to EU-15 | % impact |
|------------------|----------------------------------|----------|
| Czech Rep | -43601 | -124.9 |
| Estonia | -1790 | -11.5 |
| Hungary | -23146 | -52.1 |
| Lithuania | -20195 | -43.8 |
| Latvia | 10421 | 85.0 |
| Poland | -395077 | -70.1 |
| Slovenia | -517 | -17.7 |
| Slovakia | -64057 | -80.7 |
| EU-8 | -537961 | -67.3 |
| Bulgaria | -23228 | -18.2 |
| Romania | -566806 | -53.7 |
| EU-2 | -590034 | -49.9 |

Source: Own calculations

Figure 3.36 illustrates our estimated impact of GDP per capita and unemployment rates in the EU-15 economies on the distribution of mobile workers from the EU-8 and EU-2 economies. GDP per capita remained above the EU-15 average in Germany, Ireland, Luxembourg, the Netherlands, Austria, Sweden and the UK, and allowed these countries to gain attractiveness as a destination. Spain, in particular, was adversely affected by its high unemployment rate, which made it less attractive as a destination.

Figure 3.36. Impact of GDP per capita and unemployment rates on location shares of EU-8 and EU-2 workers, 2007-2009



Source: Own calculations, based on estimated equation reported above and NiGEM database series.

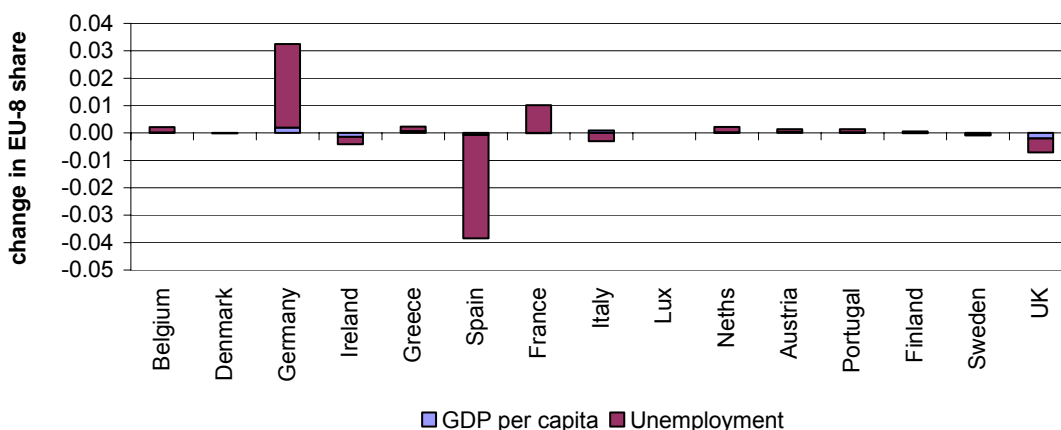
The figure above shows the impact of actual GDP per capita and unemployment rates relative to the EU-15 average on the expected distribution, but it should not be viewed as the impact of the recession itself on the distribution shares. The recession had a bigger impact on some countries than others, so what matters when assessing the impact of the recession is not the level of GDP per capita or the unemployment rate relative to the EU-15 average (which started at a relatively advantageous point in 2007 in countries such as the UK), but the level of these relative to where they might have been in the absence of the recession. In order to capture these nuances, we make the assumption that in the absence of different responses to the financial crisis, relative GDP per capita and unemployment rates would have remained unchanged between 2007 and 2009. We attribute the actual change in relative positions over this short time span to differences in the sensitivities of each economy to the global financial crisis. We can then use our model for the change in migrant share to assess the impact that the crisis had on the location decision of EU-8 and EU-2 migrants residing in the EU-15:

$$\Delta migsh_{i,crisis} = 0.43(relycap_{i,2009} - relycap_{i,2007}) - 0.27(relu_{i,2009} - relu_{i,2007})$$

The results of this assessment are illustrated in figure 3.37 below, which can be viewed as our estimate of the impact of the country-specific responses to the global downturn on the distribution of EU-8 and EU-2 mobile worker flows across the EU-15 economies. Spain fared worse than most during the downturn, and this can explain about half of its decline in share between 2007 and 2009. The UK also became less attractive as a destination, while Germany and France weathered the recession relatively well, and have become more attractive as potential destinations. Given the

macro-economic developments in these four countries in 2010-11, we would expect these trends to have continued. The lifting of transitional restrictions for workers from the EU-8 in May 2011 in Germany compound the macro-economic factors that are likely to lead a higher share of new migrants choosing Germany as a destination.

Figure 3.37. Impact of the recession on location shares of EU-8 and EU-2 workers, 2007-2009



Source: Own calculations, based on estimated equation reported above and NiGEM database.

3.8 Projections to 2017¹⁶

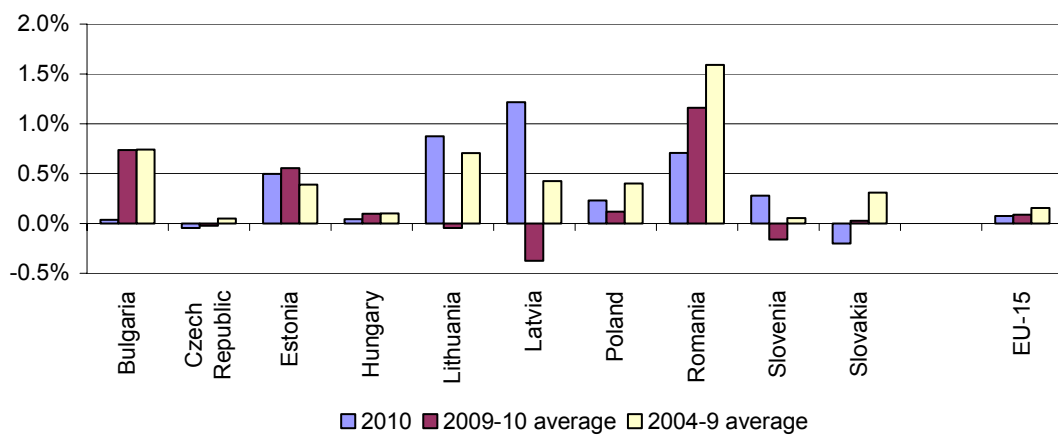
In order to assess the expected impact of population flows from the EU-8 and EU-2 over the next several years, we adopt an approach similar to that in the previous sections. We use the very simple assumption that the emigration rate observed over a sub-period of 2004-2010 is likely to persist over the next several years. After establishing an estimate for the expected population flows from the EU-8 and EU-2 to the EU-15, we will assess how the distribution of these flows across the EU-15 is likely to develop, using NIESR projections for population developments, GDP per capita and unemployment. Our forecasts for GDP growth and unemployment are reported every quarter in the *National Institute Economic Review*. We include the figures from the April 2011 issue, on which our assessment is based, in table 3.29. NIESR's population projections are based on the central scenarios of UN demographic projections. We also report the assumptions on population developments underlying our projections in table 3.32 below.

In figure 3.38 we plot a series of recent average annual emigration rates from each of the EU-8 and EU-2 economies towards the EU-15. These can be used as upper and lower bounds to the likely emigration rates that we can expect over the next several

¹⁶ Any comments or queries related to section 3.8 of the report can be addressed to Dawn Holland (d.holland@niesr.ac.uk) or Tatiana Fic (t.fic@niesr.ac.uk).

years. Our estimates for 2010 are based on quarterly observations from the Eurostat Labour Force Survey for 2010Q1-Q3. Little emigration is expected from either the Czech Republic or Hungary, whereas Romania may see up to 1½ per cent of the population emigrating per annum if the average historical rate from 2004-9 persists. The chart also illustrates the expected impact that this is likely to have on the EU-15 population, which might rise by at most 0.1 per cent per annum as a result of migration from the EU-8 and EU-2 economies over the next several years. The macro-economic impacts on the EU-15 economies will clearly be small.

Figure 3.38. Average annual emigration rates from EU-8 and EU-2 and immigration rate to EU-15



Source: Derived from Table 3.2, with 2010 estimated using Eurostat Quarterly LFS for 2010Q1-Q3

Table 3.31 reports the total population outflows from each of the EU-8 and EU-2 countries expected between 2011 and 2017 under the three scenarios illustrated in figure 3.38. We compare this to the total population flows observed between 2004-2009, as reported in table 3.4 earlier in this report.

Table 3.31. Total population net flows expected from EU-8 and EU-2 to EU-15, 2011-2017 (thousands)

| | Total flows 2011-2017, with emigration rates based on average in: | | | Total population outflows to EU-15 2004-2009 (table 3.4) | Total stock of citizens expected in the EU-15 by 2017 | |
|----------------|-------------------------------------------------------------------|-----------|-----------|----------------------------------------------------------|-------------------------------------------------------|------|
| | 2010 | 2009-2010 | 2004-2009 | | Low | High |
| Bulgaria | 21.9 | 430.9 | 434.7 | 265.6 | 461 | 874 |
| Czech Republic | -37.0 | -18.9 | 42.3 | 31.0 | 63 | 142 |
| Estonia | 53.2 | 59.5 | 41.8 | 31.4 | 107 | 125 |
| Hungary | 33.2 | 78.3 | 78.7 | 59.7 | 189 | 234 |
| Lithuania | 221.5 | -11.3 | 179.1 | 142.9 | 210 | 443 |
| Latvia | 215.0 | -66.3 | 74.8 | 57.6 | 41 | 322 |
| Poland | 703.2 | 356.9 | 1214.2 | 917.1 | 1942 | 2799 |
| Romania | 1184.0 | 1939.3 | 2657.6 | 1586.5 | 3463 | 4937 |
| Slovenia | 45.4 | -26.1 | 8.8 | 6.5 | 20 | 92 |
| Slovakia | -86.9 | 11.8 | 134.4 | 100.0 | 68 | 289 |

| | | | | | | |
|------------|--------|--------|--------|--------|------|------|
| Total EU-8 | 1147.6 | 383.9 | 1774.1 | 1346.3 | 2819 | 4209 |
| Total EU-2 | 1205.9 | 2370.1 | 3092.3 | 1852.1 | 3925 | 5811 |

Source: Figure 3.38; Table 3.4; Own calculations

Table 3.32. Projections for GDP growth, Unemployment rate and Population growth in EU-8 and EU-2, 2011-2017

| | GDP growth | | | Unemployment rate | | | Population growth | | |
|----------------|------------|------|-------------------|-------------------|------|-------------------|-------------------|------|-------------------|
| | 2011 | 2012 | 2013-17 (ave.) | 2011 | 2012 | 2013-17 (ave.) | 2011 | 2012 | 2013-17 (ave.) |
| Bulgaria | 2.6 | 4.2 | 2.6 | 10.2 | 8.1 | 8.2 | -0.6 | -0.6 | -0.6 |
| Czech Republic | 2.6 | 3.2 | 1.8 | 7.2 | 7.3 | 6.3 | 0.4 | 0.3 | 0.1 |
| Estonia | 4.2 | 4.2 | 2.4 | 13.1 | 12.4 | 12.7 | -0.1 | 0.0 | 0.0 |
| Hungary | 2.8 | 3.1 | 2.4 | 11.3 | 9.7 | 6.2 | -0.2 | -0.2 | -0.2 |
| Lithuania | 2.9 | 4.6 | 3.1 | 14.7 | 13.6 | 13.4 | -0.9 | -0.8 | -0.6 |
| Latvia | 3.9 | 4.3 | 2.5 | 14.3 | 11.4 | 11.3 | -0.4 | -0.4 | -0.4 |
| Poland | 4.2 | 4.8 | 3.6 | 9.0 | 7.6 | 4.7 | -0.1 | -0.1 | -0.1 |
| Romania | 1.5 | 3.1 | 3.4 | 6.7 | 6.1 | 6.1 | -0.4 | -0.4 | -0.4 |
| Slovakia | 4.2 | 4.6 | 2.7 | 11.9 | 10.1 | 10.1 | 0.2 | 0.2 | 0.2 |
| Slovenia | 2.3 | 2.7 | 2.1 | 7.0 | 5.7 | 6.1 | 0.1 | 0.1 | 0.1 |
| EU-15 | 1.7 | 1.9 | 2.1 | 9.5 | 8.8 | 7.6 | 0.4 | 0.3 | 0.3 |

Source: *National Institute Economic Review*, April 2011, and NiGEM April 2011 baseline

Table 3.33. Projections for GDP growth, Unemployment rate and Population growth in EU-15, 2011-2017

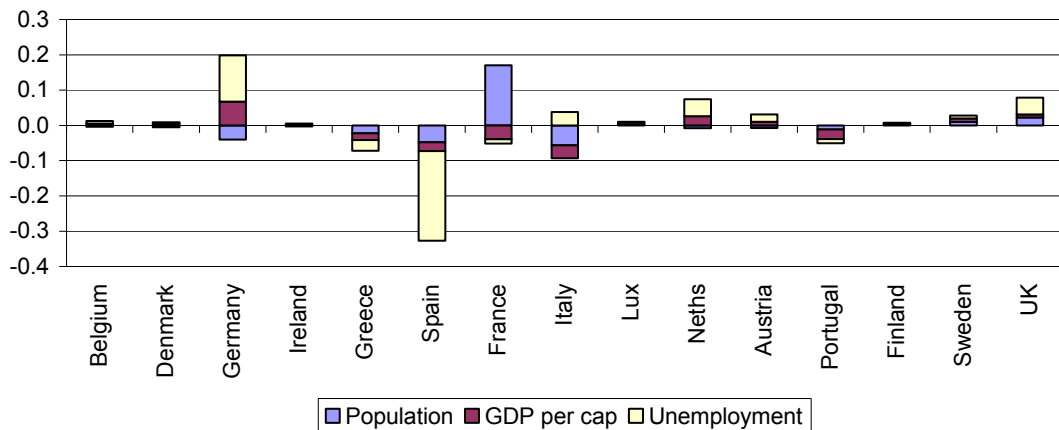
| | GDP growth | | | Unemployment rate | | | Population growth | | |
|----------|------------|------|-------------------|-------------------|------|-------------------|-------------------|------|-------------------|
| | 2011 | 2012 | 2013-17 (ave.) | 2011 | 2012 | 2013-17 (ave.) | 2011 | 2012 | 2013-17 (ave.) |
| Austria | 2.1 | 2.0 | 1.5 | 5.2 | 4.8 | 4.2 | 0.2 | 0.2 | 0.2 |
| Belgium | 2 | 1.5 | 1.8 | 7.6 | 6.9 | 7.1 | 0.4 | 0.4 | 0.3 |
| Denmark | 2 | 1.9 | 1.9 | 7.9 | 7.0 | 7.1 | 0.2 | 0.2 | 0.1 |
| Finland | 3.6 | 2.6 | 2.0 | 8.0 | 6.8 | 6.6 | 0.4 | 0.3 | 0.3 |
| France | 1.6 | 1.9 | 1.9 | 9.6 | 8.9 | 8.0 | 0.4 | 0.4 | 0.4 |
| Germany | 2.6 | 2.3 | 2.1 | 6.1 | 5.1 | 5.2 | -0.2 | -0.2 | -0.2 |
| Greece | -2.5 | 2.1 | 2.1 | 13.9 | 14.7 | 11.9 | 0.2 | 0.2 | 0.1 |
| Ireland | 0.0 | 2.6 | 3.0 | 14.3 | 11.2 | 7.1 | 1.5 | 1.4 | 1.2 |
| Italy | 1.0 | 1.6 | 1.5 | 8.4 | 7.8 | 6.8 | 0.3 | 0.3 | 0.1 |
| Neths. | 1.8 | 1.8 | 1.5 | 4.0 | 4.0 | 3.6 | 0.4 | 0.3 | 0.3 |
| Portugal | -1.3 | 0.4 | 1.5 | 12.4 | 12.2 | 9.1 | 0.2 | 0.2 | 0.0 |
| Spain | 0.9 | 1.5 | 2.9 | 20.5 | 19.5 | 15.2 | 0.9 | 0.9 | 0.8 |
| Sweden | 4.2 | 2.4 | 2.0 | 7.2 | 6.9 | 6.5 | 0.4 | 0.4 | 0.4 |
| UK | 1.5 | 1.9 | 2.5 | 8.6 | 8.3 | 6.5 | 0.6 | 0.6 | 0.6 |

Source: *National Institute Economic Review*, April 2011, and NiGEM April 2011 baseline

Our estimates for the EU-8 countries range from 0.4-1.7 million expected to emigrate to the EU-15 over the next seven years. This compares to total net outflows of 1.3 million between 2004-2009. Outflows from the EU-2 are expected to remain significant if recent emigration rates are a useful guide. We project total net outflows from these countries to the EU-15 of 1.2-3 million over the next seven years. The stock of Bulgarians residing in the EU-15 may reach as high as 870 thousand by 2017, while the stock of Romanians may be close to 5 million. As population decline becomes an increasing problem in Bulgaria and Romania, they may want to intensify recent efforts to attract return migrants and promote circular migration.

Figure 3.39 illustrates the expected impact on the distribution of migrant shares across the EU-15 between 2009 and 2017 (based on the model used in the previous sections) and GDP per capita, unemployment and demographic developments (using NIESR's forecasts for this period reported in table 3.33). Germany and France are relatively attractive destinations for migrants at the moment, and we would expect them to gain migrant share over the next several years due to their more favourable macroeconomic prospects compared to the EU average. This would allow Germany to recover some of the share lost between 2004 and 2009.

Figure 3.39. Expected shift in share of migrant stock from the EU-8 and EU-2 (and explanatory factors), 2009-2017



Source: Own calculations based on estimated equation reported above and projections in table 3.30

While restrictions on labour market access have been lifted in all countries for citizens of the EU-8 economies, workers from the EU-2 still face some restrictions on access to labour markets in Belgium, Germany, Ireland, France, Italy, Luxembourg, the Netherlands, Austria, and the UK. If these restrictions are extended for a further two years at the end of 2011, these countries can be expected to lose some migrant share relative to what they could expect in the absence of restrictions. The magnitude of the impact will depend on how many other countries also maintain the restrictions in the final phase of the transitional arrangements.

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7. Appendix A. Detailed tables characterising EU-8+2 workers in the EU-15

Table A7.1. Skill structure of mobile workers from EU8+2 residing in EU15 countries, based on educational attainment (2010)

":" indicate that the figures are too small to be reliable
figures in brackets : limited reliability due to small sample size

| Skills structure of EU8+2 residing in EU15 countries | | | | Skills structure of EU8 residing in EU15 countries | | | | Skills structure of EU2 residing in EU15 countries | | | |
|------------------------------------------------------|--------|--------|------|----------------------------------------------------|--------|--------|------|----------------------------------------------------|--------|--------|--------|
| | Low | Medium | High | | Low | Medium | High | | Low | Medium | High |
| BE | 37 | 39 | 24 | BE | 28 | 43 | 29 | BE | 47 | 34 | 19 |
| DK | (19.5) | 41 | 40 | DK | : | 38 | 44 | DK | : | : | : |
| DE | 24 | 51 | 25 | DE | 23 | 52 | 25 | DE | 27 | 47 | 26 |
| IE | 21 | 49 | 30 | IE | 20 | 50 | 30 | IE | (33.3) | 41 | (25.8) |
| EL | 43 | 48 | 10 | EL | (21.6) | 61 | : | EL | 47 | 45 | 8 |
| ES | 33 | 48 | 18 | ES | 19 | 45 | 36 | ES | 35 | 49 | 16 |
| FR | 27 | 45 | 28 | FR | 20 | 49 | 31 | FR | 33 | 41 | 26 |
| IT | 34 | 59 | 7 | IT | 27 | 62 | 11 | IT | 35 | 59 | 7 |
| LU | : | (14.2) | 80 | LU | : | : | 81 | LU | : | : | (78.1) |
| NL | 33 | 41 | 26 | NL | 29 | 44 | 27 | NL | 41 | (34.6) | (23.9) |
| AT | 18 | 64 | 18 | AT | 11 | 69 | 21 | AT | 34 | 53 | (12.6) |
| PT | 38 | 49 | : | PT | : | : | : | PT | 40 | 54 | : |
| FI | 48 | 41 | : | FI | 47 | 41 | : | FI | : | : | : |
| SE | 27 | 31 | 43 | SE | 27 | 31 | 42 | SE | : | : | 44 |
| UK | 18 | 66 | 16 | UK | 18 | 67 | 16 | UK | 22 | 61 | 17 |

Skills structure of Bulgarian, Polish and Romanian residing in EU15 countries

| country | citizen | Low | Medium | High | country | citizen | Low | Medium | High |
|---------|---------|--------|--------|--------|---------|---------|--------|--------|--------|
| EU 15 | BG | 34 | 45 | 21 | | | | | |
| | PL | 20 | 59 | 21 | | | | | |
| | RO | 34 | 54 | 12 | | | | | |
| BE | BG | 54 | (28.3) | : | FR | BG | : | (42.6) | (44.1) |
| | PL | 28 | 49 | 24 | | PL | 22 | 54 | 25 |
| | RO | 44 | 37 | (19.2) | | RO | 37 | 41 | 22 |
| DE | BG | 23 | 43 | 34 | IT | BG | 45 | 43 | 12 |
| | PL | 23 | 53 | 24 | | PL | 26 | 65 | 10 |
| | RO | 30 | 50 | 20 | | RO | 34 | 59 | 6 |
| IE | BG | : | : | : | NL | BG | (49.1) | (37.0) | : |
| | PL | 18 | 51 | 31 | | PL | 30 | 43 | (26.3) |
| | RO | (35.1) | (41.8) | : | | RO | (34.1) | (32.3) | (33.7) |
| EL | BG | 52 | 37 | 11 | AT | BG | : | (47.0) | : |
| | PL | : | 67 | : | | PL | (11.9) | 67 | 21 |
| | RO | 37 | 59 | : | | RO | 36 | 55 | (9.6) |
| ES | BG | 32 | 48 | 20 | UK | BG | : | 61 | 22 |
| | PL | 19 | 51 | 30 | | PL | 16 | 68 | 15 |
| | RO | 36 | 49 | 15 | | RO | 24 | 62 | 14 |

Source: Labour Force Survey

Table A7.2. The structure of occupations in which EU-8+2 nationals are employed in EU-15 countries (2010)

":" indicate that the figures are too small to be reliable
figures in brackets : limited reliability due to small sample size
Armed forces are excluded

| Occupational structure of EU8 and EU2 residing and working in EU15 countries | | | |
|-------------------------------------------------------------------------------------|-----|-----|-------|
| ISCO1D | EU8 | EU2 | EU8+2 |
| Legislators senior officials and managers | 5 | 2 | 3 |
| Professionals | 7 | 3 | 5 |
| Technicians and associate professionals | 7 | 4 | 6 |
| Clerks | 6 | 3 | 4 |
| Service workers and shop and market sales workers | 17 | 15 | 16 |
| Skilled agricultural and fishery workers | 1 | 2 | 2 |
| Craft and related trades workers | 16 | 26 | 21 |
| Plant and machine operators and assemblers | 12 | 10 | 11 |
| Elementary occupations | 28 | 36 | 32 |

Occupational structure of EU8+2 residing and working in selected EU15 countries

| ISCO1D | EU-15 | BE | DE | IE | EL | ES | FR | IT | NL | AT | UK |
|---------------------------------------------------|-------|----|----|----|----|----|----|----|----|----|----|
| Legislators senior officials and managers | 3 | 20 | 4 | 5 | : | 1 | : | 1 | : | 5 | 5 |
| Professionals | 5 | 9 | 12 | 4 | : | 1 | 13 | 1 | 13 | 8 | 5 |
| Technicians and associate professionals | 6 | : | 14 | : | : | 3 | 11 | 4 | 9 | 13 | 4 |
| Clerks | 4 | : | 6 | 6 | : | 2 | : | 3 | 12 | 7 | 6 |
| Service workers and shop and market sales workers | 16 | 10 | 17 | 27 | 21 | 18 | 15 | 11 | 11 | 23 | 17 |
| Skilled agricultural and fishery workers | 2 | : | : | : | : | 2 | : | 3 | : | : | : |
| Craft and related trades workers | 21 | 23 | 20 | 14 | 17 | 23 | 30 | 31 | 15 | 16 | 12 |
| Plant and machine operators and assemblers | 11 | 5 | 6 | 15 | 6 | 11 | : | 9 | 8 | 6 | 17 |
| Elementary occupations | 32 | 25 | 20 | 24 | 47 | 39 | 19 | 37 | 24 | 21 | 34 |

Occupational structure of EU8 residing and working in selected EU15 countries

| | EU 15 | BE | DE | IE | ES | IT | NL | AT | UK |
|---------------------------------------------------|----------|-------|----|-------|-------|-------|--------|-------|----|
| Legislators senior officials and managers | 5 | 20 | 4 | 5 | : | (2.5) | : | (6.2) | 5 |
| Professionals | 7 | : | 11 | (4.2) | : | : | (10.1) | (9.5) | 5 |
| Technicians and associate professionals | 7 | : | 14 | : | 13 | 9 | (9.6) | 15 | 4 |
| Clerks | 6 | : | 7 | 6 | : | 6 | (12.5) | (6.4) | 6 |
| Service workers and shop and market sales workers | 17 | (8.7) | 16 | 28 | 26 | 17 | (9.9) | 24 | 16 |
| Skilled agricultural and fishery workers | 1 | : | : | : | 0 | : | : | : | : |
| Craft and related trades workers | 16 | 23 | 21 | 14 | 25 | 18 | (12.7) | 17 | 11 |
| Plant and machine operators and assemblers | 12 | : | 6 | 15 | (5.3) | 7 | : | : | 18 |
| Elementary occupations | 28 | 28 | 19 | 24 | 20 | 37 | 26 | 17 | 35 |

Occupational structure of EU2 residing and working in selected EU15 countries

| | EU15 | DE | EL | ES | FR | IT |
|---------------------------------------------------|------|----|-------|----|--------|----|
| Legislators senior officials and managers | 2 | : | : | 1 | : | 1 |
| Professionals | 3 | 14 | : | : | (12.7) | 1 |
| Technicians and associate professionals | 4 | 14 | : | 2 | : | 3 |
| Clerks | 3 | : | : | 1 | : | 3 |
| Service workers and shop and market sales workers | 15 | 23 | 20 | 17 | (14.1) | 11 |
| Skilled agricultural and fishery workers | 2 | : | : | 2 | : | 3 |
| Craft and related trades workers | 26 | 12 | 15 | 23 | 33 | 33 |
| Plant and machine operators and assemblers | 10 | : | (6.3) | 12 | : | 10 |
| Elementary occupations | 36 | 20 | 50 | 41 | (19.2) | 37 |

Occupational structure of Bulgarian nationals residing and working in selected EU15 countries

| | EU15 | EL | ES | IT |
|---------------------------------------------------|-------|--------|-------|----|
| Legislators senior officials and managers | (3.8) | : | (2.8) | : |
| Professionals | 7 | : | : | : |
| Technicians and associate professionals | (4.0) | : | : | : |
| Clerks | : | : | : | : |
| Service workers and shop and market sales workers | 18 | 22 | 15 | : |
| Skilled agricultural and fishery workers | : | : | : | : |
| Craft and related trades workers | 15 | (11.1) | 14 | 21 |
| Plant and machine operators and assemblers | 10 | : | 18 | 15 |
| Elementary occupations | 38 | 52 | 46 | 47 |

Occupational structure of Romanian nationals residing and working in selected EU15 countries

| | EU 15 | EL | ES | IT |
|---------------------------------------------------|----------|----|----|----|
| Legislators senior officials and managers | 1 | 0 | 1 | 1 |
| Professionals | 2 | 2 | 0 | 1 |
| Technicians and associate professionals | 4 | 0 | 2 | 3 |
| Clerks | 3 | 1 | 2 | 3 |
| Service workers and shop and market sales workers | 14 | 15 | 18 | 11 |
| Skilled agricultural and fishery workers | 3 | 3 | 3 | 3 |
| Craft and related trades workers | 28 | 22 | 24 | 33 |
| Plant and machine operators and assemblers | 9 | 9 | 11 | 9 |
| Elementary occupations | 36 | 47 | 40 | 36 |

Occupational structure of Polish nationals residing and working in selected EU15 countries

| | EU-15 | DE | IE | ES | IT | UK |
|---------------------------------------------------|--------------|----|-------|----|-------|----|
| Legislators senior officials and managers | 4 | 4 | (4.4) | : | : | 4 |
| Professionals | 6 | 7 | (4.3) | 0 | : | 5 |
| Technicians and associate professionals | 6 | 12 | : | 15 | 9 | 3 |
| Clerks | 6 | 7 | (7.1) | : | (3.4) | 6 |
| Service workers and shop and market sales workers | 16 | 15 | 28 | 24 | 15 | 15 |
| Skilled agricultural and fishery workers | 1 | : | : | 0 | : | : |
| Craft and related trades workers | 18 | 25 | 15 | 28 | 19 | 12 |
| Plant and machine operators and assemblers | 12 | 6 | 14 | : | 6 | 19 |
| Elementary occupations | 30 | 23 | 23 | 24 | 43 | 35 |

Occupational structure of EU8+2, EU8 and EU2 residing and working in selected EU15 countries (by group of occupations)

EU8+2

| | ISCO1-3 | ISCO4-8 | ISCO9 |
|-------------|---------|---------|-------|
| EU15 | 14 | 54 | 32 |
| BE | 31 | 44 | 25 |
| DK | 26 | 47 | 27 |
| DE | 30 | 51 | 20 |
| IE | 12 | 64 | 24 |
| EL | (4.3) | 48 | 47 |
| ES | 5 | 56 | 39 |
| FR | 28 | 53 | 19 |
| IT | 6 | 58 | 37 |
| LU | 84 | : | : |
| NL | 25 | 50 | 24 |
| AT | 26 | 53 | 21 |
| FI | (22.4) | 59 | : |
| SE | 26 | 54 | 20 |
| UK | 14 | 52 | 34 |

EU8

| | ISCO1-3 | ISCO4-8 | ISCO9 |
|-------------|---------|---------|--------|
| EU15 | 19 | 53 | 28 |
| BE | 29 | 43 | 28 |
| DK | (29.9) | 46 | (24.0) |
| DE | 29 | 51 | 19 |
| IE | 11 | 65 | 24 |
| ES | 21 | 60 | 20 |
| FR | 30 | 51 | (18.9) |
| IT | 13 | 49 | 37 |
| LU | 83 | : | : |
| NL | (23.4) | 50 | 26 |
| AT | 31 | 52 | 17 |
| FI | (21.6) | 60 | : |
| SE | 27 | 54 | 19 |
| UK | 13 | 52 | 35 |

EU2

| | ISCO1-3 | ISCO4-8 | ISCO9 |
|-------------|---------|---------|--------|
| EU15 | 8 | 56 | 36 |
| BE | 33 | 46 | (21.0) |
| DE | 32 | 48 | 20 |
| EL | : | 47 | 50 |
| ES | 4 | 55 | 41 |
| FR | (26.6) | 54 | (19.2) |
| IT | 4 | 59 | 37 |
| LU | (86.4) | : | : |
| NL | (29.9) | (50.2) | : |
| AT | (14.6) | 55 | 31 |
| UK | 18 | 53 | 29 |

ISCO1D

1. Legislators senior officials and managers
2. Professionals
3. Technicians and associate professionals
4. Clerks
5. Service workers and shop and market sales workers
6. Skilled agricultural and fishery workers
7. Craft and related trades workers
8. Plant and machine operators and assemblers
9. Elementary occupations

Armed forces are excluded

Occupational structure of EU8/EU2 residing and working in EU15, by citizenship
 (by group of occupations)

| Citizenship : | ISCO1-3 | ISCO4-8 | ISCO9 |
|---------------|---------|---------|-------|
| BG | 15 | 47 | 38 |
| CZ | 38 | 47 | 15 |
| HU | 34 | 47 | 19 |
| LT | 14 | 57 | 30 |
| LV | : | 56 | 34 |
| PL | 16 | 54 | 30 |
| RO | 7 | 57 | 36 |
| SK | 30 | 48 | 23 |

Occupational structure of Romanian nationals residing and working in selected EU15
 countries (by group of occupations)

| | ISCO1-3 | ISCO4-8 | ISCO9 |
|-------------|---------|---------|--------|
| EU15 | 7 | 57 | 36 |
| BE | (34.5) | 45 | (21.0) |
| DE | 28 | 47 | 25 |
| EL | : | 51 | 47 |
| ES | 3 | 57 | 40 |
| FR | (21.6) | 59 | (19.5) |
| IT | 4 | 59 | 36 |
| LU | (81.9) | : | : |
| AT | : | 56 | 32 |
| UK | 16 | 60 | 24 |

Occupational structure of Bulgarian nationals residing and working in selected EU15
 countries (by group of occupations)

| | ISCO1-3 | ISCO4-8 | ISCO9 |
|--------------|---------|---------|-------|
| EU-15 | 14.8 | 46.7 | 38.5 |
| DE | 36.5 | 49.8 | : |
| EL | : | 44.3 | 51.9 |
| ES | 5.7 | 48.6 | 45.7 |
| IT | : | 46.3 | 47.0 |
| UK | : | 41.0 | 37.8 |

Occupational structure of Polish nationals residing and working in selected EU15
 countries (by group of occupations)

| | ISCO1-3 | ISCO4-8 | ISCO9 |
|-------------|---------|---------|--------|
| EU15 | 16.4 | 53.7 | 29.9 |
| BE | 22.6 | 46.5 | 30.9 |
| DE | 23.1 | 53.9 | 23.0 |
| IE | 10.3 | 66.5 | 23.2 |
| ES | 19.2 | 57.1 | 23.8 |
| FR | (24.8) | 54.3 | (20.9) |
| IT | 12.3 | 44.7 | 43.1 |
| NL | (18.6) | 50.6 | (30.9) |
| AT | (27.2) | 55.0 | (17.8) |
| SE | 22.7 | 60.4 | 17.0 |
| UK | 11.8 | 53.3 | 34.9 |

Source: Labour Force Survey

Table A7.3. The structure of sectors in which EU-8+2 nationals are employed in EU-15 countries (2010)

*": " indicate that the figures are too small to be reliable
 figures in brackets : limited reliability due to small sample size*

| Sectoral structure of EU8 and EU2 residing and working in EU15 countries | | | |
|--------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|
| NACEID | EU8 | EU2 | EU8+2 |
| Accommodation and food service activities | 13 | 12 | 13 |
| Activities of extraterritorial organisations and bodies | : | : | (0.2) |
| Activities of households as employers; undifferentiated goods-and services-producing activities of household for own use | 3 | 16 | 10 |
| Administrative and support service activities | 8 | 6 | 7 |
| Agriculture | 3 | 6 | 4 |
| Arts | 1 | 1 | 1 |
| Construction | 11 | 22 | 17 |
| Education | 3 | 1 | 2 |
| Electricity | : | : | : |
| Financial and insurance activities | 1 | : | 1 |
| Human health and social work activities | 9 | 5 | 7 |
| Information and communication | 2 | 1 | 1 |
| Manufacturing | 19 | 13 | 16 |
| Mining and quarrying | : | : | : |
| Other service activities | 2 | 3 | 3 |
| Professional | 3 | 1 | 2 |
| Public administration and defence; compulsory social security | 1 | (0.6) | 1 |
| Real estate activities | (0.5) | : | (0.3) |
| Transportation and storage | 6 | 5 | 5 |
| Water supply; sewerage | (0.6) | (0.5) | 1 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 14 | 7 | 11 |

Sectoral structure of EU8+2 residing and working in selected EU15 countries

| NACE1D | DE | ES | IT | UK |
|--------------------------------------------------------------------------------------------------------------------------|----|-------|----|----|
| Accommodation and food service activities | 12 | 16 | 9 | 14 |
| Activities of extraterritorial organisations and bodies | : | 0 | 0 | 0 |
| Activities of households as employers; undifferentiated goods-and services-producing activities of household for own use | 3 | 16 | 20 | 1 |
| Administrative and support service activities | 9 | 6 | 4 | 8 |
| Agriculture | 2 | 8 | 5 | 2 |
| Arts | 2 | (0.8) | 1 | 1 |
| Construction | 14 | 19 | 24 | 9 |
| Education | 4 | : | 0 | 3 |
| Electricity | : | : | : | : |
| Financial and insurance activities | : | : | : | : |
| Human health and social work activities | 12 | 2 | 5 | 8 |
| Information and communication | 2 | (0.4) | : | 2 |
| Manufacturing | 15 | 11 | 16 | 23 |
| Mining and quarrying | 0 | : | : | : |
| Other service activities | 3 | 1 | 5 | 1 |
| Professional | 4 | : | 1 | 3 |
| Public administration and defence; compulsory social security | : | 1 | : | 1 |
| Real estate activities | : | : | : | : |
| Transportation and storage | 4 | 6 | 4 | 7 |
| Water supply; sewerage | : | : | 0 | : |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 9 | 11 | 5 | 16 |

Sectoral structure of EU8+2 residing and working in selected EU15 countries (groups of sectors)

A **Agriculture, forestry and fishing**, B Mining and quarrying, C **Manufacturing**, D Electricity, gas, steam and air conditioning supply, E Water supply; sewerage, waste management and remediation activities, F **Construction**, G **Wholesale and retail trade**; repair of motor vehicles and motorcycles, H Transportation and storage, I **Accommodation and food service activities**, J Information and communication, K Financial and insurance activities, L Real estate activities, M Professional, scientific and technical activities, N Administrative and support service activities, O Public administration and defence; compulsory social security, P Education, Q Human health and social work activities, R Arts, entertainment and recreation, S Other service activities, T **Activities of households as employers**; undifferentiated goods- and services-producing activities of households for own use

Sectoral structure of EU8+2 residing and working in selected EU15 countries (groups of sectors)

| | A | B-E | F | G-J | K-N | O-T |
|--------------|-------|--------|--------|--------|--------|-----|
| EU 15 | 4 | 17 | 17 | 30 | 10 | 23 |
| BE | : | (7.7) | 34 | 19 | 19 | 19 |
| DK | : | (15.8) | : | (23.5) | (14.8) | 27 |
| DE | 2 | 16 | 14 | 28 | 15 | 25 |
| IE | (3.3) | 23 | 8 | 48 | 9 | 9 |
| EL | 10 | 8 | 15 | 25 | (6.4) | 35 |
| ES | 8 | 12 | 19 | 33 | 7 | 21 |
| FR | : | (6.0) | 31 | 23 | (7.1) | 32 |
| IT | 5 | 16 | 24 | 18 | 6 | 31 |
| NL | : | (11.5) | (12.3) | 27 | (19.2) | 25 |
| AT | (4.1) | 13 | 13 | 37 | 14 | 20 |
| SE | : | 14 | 16 | 17 | 22 | 28 |
| UK | 2 | 24 | 9 | 38 | 12 | 14 |

Sectoral structure of EU8 residing and working in selected EU15 countries (groups of sectors)

| NACE1D2 | A | B-E | F | G-J | K-N | O-T |
|--------------|-------|--------|----|--------|--------|--------|
| EU-15 | 3 | 20 | 11 | 34 | 12 | 20 |
| BE | : | : | 34 | (11.0) | 24 | 21 |
| DE | 3 | 17 | 14 | 26 | 15 | 25 |
| IE | (3.4) | 24 | 7 | 49 | 8 | 9 |
| ES | : | 12 | 15 | 49 | (6.0) | 15 |
| FR | : | : | 29 | (21.3) | : | 38 |
| IT | 4 | 13 | 12 | 24 | 9 | 39 |
| NL | : | (11.3) | : | (28.4) | (18.6) | (26.4) |
| AT | : | 11 | 14 | 37 | 13 | 21 |
| SE | : | 15 | 17 | 17 | 21 | 26 |
| UK | 2 | 26 | 7 | 39 | 11 | 14 |

Sectoral structure of EU2 residing and working in selected EU15 countries (groups of sectors)

| NACE1D2 | A | B-E | F | G-J | K-N | O-T |
|---------------|----|--------|----|--------|--------|--------|
| EU -15 | 6 | 14 | 22 | 25 | 8 | 26 |
| BE | : | : | 35 | 29 | (13.7) | (15.2) |
| DE | : | 13 | 10 | 35 | 13 | 27 |
| EL | 11 | 9 | 13 | 24 | (6.9) | 36 |
| ES | 9 | 11 | 19 | 32 | 7 | 22 |
| FR | : | : | 34 | (24.4) | : | 27 |
| IT | 5 | 17 | 26 | 17 | 5 | 30 |
| AT | : | (16.4) | : | 37 | (14.8) | (16.5) |
| UK | : | 8 | 27 | 30 | 15 | 18 |

Sectoral structure of Romanian nationals residing and working in selected EU15 countries (groups of sectors)

| NACE1D2 | A | B-E | F | G-J | K-N | O-T |
|-------------|---|-----|----|--------|-----|--------|
| EU15 | 6 | 14 | 24 | 24 | 7 | 26 |
| DE | : | 16 | : | 35 | 12 | 26 |
| ES | 9 | 11 | 21 | 30 | 6 | 22 |
| FR | : | : | 39 | (16.0) | : | (31.2) |
| IT | 5 | 17 | 26 | 17 | 5 | 30 |
| UK | : | : | 31 | 34 | : | 15 |

Sectoral structure of Bulgarian nationals residing and working in selected EU15 countries (groups of sectors)

| NACE1D2 | A | B-E | F | G-J | K-N | O-T |
|--------------|--------|-----|--------|-----|-------|-----|
| EU 15 | 7 | 12 | 12 | 33 | 12 | 25 |
| EL | (11.8) | : | (8.5) | 25 | : | 43 |
| ES | 11 | 12 | 9 | 40 | 10 | 18 |
| IT | (9.9) | 19 | (10.7) | 18 | (8.0) | 34 |

Sectoral structure of Polish nationals residing and working in selected EU15 countries (groups of sectors)

| NACE1D2 | A | B-E | F | G-J | K-N | O-T |
|--------------|-------|-----|--------|--------|-----|--------|
| EU-15 | 3 | 20 | 14 | 32 | 12 | 20 |
| BE | : | : | 36 | : | 25 | (19.2) |
| DE | 3 | 15 | 18 | 24 | 15 | 24 |
| IE | : | 22 | 8 | 51 | 8 | 9 |
| ES | : | 13 | 16 | 48 | : | 14 |
| FR | : | : | (31.5) | (17.0) | : | 42 |
| IT | (3.9) | 12 | 13 | 19 | 9 | 44 |
| UK | 2 | 27 | 8 | 39 | 11 | 14 |

Source: Labour Force Survey

8. Appendix B: The Structure and Use of the NiGEM Model

The National Institute has been developing its global econometric model, NiGEM, since 1987. NiGEM is used internally for forecasting and policy analysis, and is also used by an external group of about 40 model subscribers, mainly in the policy community, including the ECB, the IMF, the FSA, the Bank of England, and the central banks of France, Italy, Netherlands, Spain, Portugal and Sweden. The Institute produces four forecasts a year with NiGEM. These projections are published in the *National Institute Economic Review* each quarter, along with a discussion of alternative scenarios around the central forecast and short notes based on recent model-based research. This work is also presented at several conferences each year, is widely reported in the press and is made available on NIESR's web-based product, NiGEMWEB (<http://nimodel.niesr.ac.uk>).

NiGEM is a global model, and most countries in the OECD are modelled individually. There are also separate models of China, India, Russia, Hong Kong, Taiwan, Brazil, South Africa, Estonia, Latvia, Lithuania, Slovenia, Romania and Bulgaria, while the rest of the world is modelled through regional blocks. All country models contain the determinants of domestic demand, export and import volumes, prices, current accounts and net assets. Economies are linked through trade, competitiveness and financial markets and are fully simultaneous.

A major use of the model is in policy analysis. In policy analyses the model can be switched between forward looking, rational expectations mode and adaptive learning for consumers, firms, labour and financial markets. Policy environments are very flexible, allowing a number of monetary and fiscal policy responses. The model framework can be used by any user to build a bespoke model or to change the existing structure.

For a macro-econometric model to be useful for policy analyses, particular attention must be paid to its long-term equilibrium properties. At the same time, we need to ensure that short-term dynamic properties and underlying estimated properties are consistent with data and well-determined. Output is tied down in the long run by factor inputs and technical progress interacting through production functions. As far as possible, the same long run theoretical structure of NiGEM has been adopted for each of the major industrial countries, except where clear institutional, or other factors, prevent this. As a result, variations in the properties of each country model reflect genuine differences in data and estimated parameters, rather than different theoretical approaches.

Over the past twelve months NIESR has made a number of interventions in the policy debate based on its research on the world economy. There has been a strong focus on

fiscal policy this year, through evaluations of the policy response to the downturn, a comparison of fiscal multipliers across countries and across models, assessments of the sovereign debt crisis in Europe, and evaluations of the fiscal consolidation programmes put forward in the UK and in the rest of Europe. This work has been published in the *National Institute Economic Review*, and has also been presented at conferences held by the United Nations, Euroframe, the Kiel Institute and Swedbank. Our work on fiscal consolidation plans has received wide coverage in national and international newspapers, trade and more general publications as well as on national and international TV and radio.

Production and price setting

The major country models rely on an underlying constant-returns-to-scale CES production function with labour-augmenting technical progress. This is embedded within a Cobb-Douglas relationship to allow the factors of production to interact with oil usage:

$$Q = \gamma \left\{ s(K)^{-\rho} + (1-s)(Le^{\lambda t})^{-\rho} \right\}^{-1/\rho} M^{1-\alpha} \quad (1)$$

where Q is real output, K is the total capital stock, L is total hours worked, t is an index of labour-augmenting technical progress and M is oil input. This constitutes the theoretical background for the specifications of the factor demand equations, forms the basis for unit total costs and provides a measure of capacity utilization, which then feeds into the price system. Barrell and Pain (1997) show that the elasticity of substitution is estimated from the labour demand equation, and in general it is around 0.5. Demand for labour and capital are determined by profit maximisation of firms, implying that the long-run labour-output ratio depends on real wage costs and technical progress, while the long-run capital output ratio depends on the real user cost of capital

$$\ln(L) = c_1 + \ln(Q) - (1-\sigma)\lambda t - \sigma \ln(w/p) \quad (2)$$

$$\ln(K) = c_2 + \ln(Q) - \sigma \ln(c/p) \quad (3)$$

where c_1 and c_2 are constant terms related to the other parameters in the model, w/p is the real wage and c/p is the real user cost of capital. The user cost of capital is influenced by corporate taxes, depreciation and risk premia and is a weighted average of the cost of equity finance and the margin adjusted long real rate, with weights that vary with the size of equity markets as compared to the private sector capital stock. Business investment is determined by the error correction based relationship between actual and equilibrium capital stocks. Government investment depends upon trend output and the real interest rate in the long run. Prices are determined as a constant mark-up over marginal costs in the long term.

Labour market

NiGEM assumes that employers have a right to manage, and hence the bargain in the labour market is over the real wage. Real wages, therefore, depend on the level of trend labour productivity as well as the rate of unemployment. Labour markets embody rational expectations and wage bargainers use model consistent expectations. The dynamics of the wage market depend upon the error correction term in the equation and on the split between lagged inflation and forward inflation as well as on the impact of unemployment on the wage bargain (Anderton and Barrell 1995). There is no explicit equation for sustainable employment in the model, but as the wage and price system is complete, the model delivers equilibrium levels of employment and unemployment. An estimate of the NAIRU can be obtained by substituting the mark-up adjusted unit total cost equation into the wage equation and solving for the unemployment rate. Labour supply is determined by demographics, migration and the participation rate.

Consumption, personal income and wealth

Consumption decisions are presumed to depend on real disposable income and real wealth in the long run, and follow the pattern discussed in Barrell and Davis (2007). Total wealth is composed of both financial wealth and tangible (housing) wealth where the latter data is available.

$$\ln(C) = \alpha + \beta \ln(RPDI) + (1 - \beta) \ln(RFN + RTW) \quad (4)$$

where C is real consumption, $RPDI$ is real personal disposable income, RFN is real net financial wealth and RTW is real tangible wealth. The dynamics of adjustment to the long run are largely data based, and differ between countries to take account of differences in the relative importance of types of wealth and of liquidity constraints.

Table B8.1. Key consumption equation parameters

| | β | $\Delta \ln(RPDI)$ | $\Delta \ln(RTW)$ | $\Delta \ln(RTW_{.1})$ | $\Delta \ln(RFW_{.1})$ |
|---------|---------|--------------------|-------------------|------------------------|------------------------|
| US | 0.81 | 0.15 | | 0.154 | 0.034 |
| Germany | 0.78 | 0.68 | 0.022 | | |
| France | 0.71 | 0.51 | | | 0.038 |
| UK | 0.93 | 0.17 | | 0.160 | 0.029 |

Note: β gives the long-run weight on income from equation 1, while other parameters indicate the short-run response of consumption to changes in real income and wealth.

The key parameters embedded in our model equations for the US, UK, Germany and France are reported in table 9.1. The impact of a change in housing wealth is about five times stronger than the impact of a change in financial wealth in the short run in the US and the UK, whereas wealth effects are relatively weak in Germany and France. Al Eyd and Barrell (2005) discuss borrowing constraints, and investigate the role of changes in the number of borrowing constrained households. It is common to

associate the severity of borrowing constraints with the coefficient on changes in current income in the equilibrium correction equation for consumption. This suggests relatively few borrowing constraints in the US and the UK, with a greater degree of borrowing constraints in Germany and France.

Financial markets

We generally assume that exchange rates are forward looking, and ‘jump’ when there is news. The size of the jump depends on the expected future path of interest rates and exchange rate risk premia, solving an uncovered interest parity condition, so that the expected change in the exchange rate is given by the difference in the interest earned on assets held in local and foreign currencies.

$$e_t = e_{t+1} \left(\frac{1+r_t^*}{1+r_t} \right) (1+rp_t) + w_t \tag{5}$$

where e_t is the bilateral exchange rate at time t (defined as domestic currency per unit of foreign currency), r_t is the short-term nominal interest rate at home set in line with a policy rule, r_t^* is the interest rate abroad and rp_t is the exchange rate risk premium.

Interest rates are determined by policy rules adopted by monetary authorities as discussed in Barrell, Hall and Hurst (2006). Nominal short term interest rates are set in relation to a standard forward looking feedback rule. Our default rule follows a ‘two-pillar’ strategy, targeting a combination of inflation and a nominal aggregate. Forward looking long-term interest rates (LR) are a forward convolution of expected short-term interest rates:

$$(1+LR_t) = \prod_{j=1}^T (1+r_{t+j})^{1/T} \tag{6}$$

We assume that equity markets are also forward looking, with equity prices determined by the discounted present value of expected profits, adjusted by an equity risk premium.

Public sector

We model corporate (CTAX) and personal (TAX) direct taxes and indirect taxes (ITAX) on spending, along with government spending on investment and on current consumption, and separately identify transfers and government interest payments. Each source of taxes has an equation applying a tax rate (?TAXR) to a tax base (profits, personal incomes or consumption). As a default we have government spending on investment (GI) and consumption (GC) rising in line with trend output in the long run, with delayed adjustment to changes in the trend. They are re-valued in line with the consumers’ expenditure deflator (CED). Government interest payments (GIP) are driven by a perpetual inventory of accumulated debts. Transfers (TRAN) to

individual are composed of three elements, with those for the inactive of working age and the retired, depending upon observed replacement rates. Spending minus receipts give us the budget deficit (*BUD*):

$$BUD = CED*(GC+GI)+TRAN+GIP-TAX-CTAX-MTAX \quad (7)$$

We have to consider how the government deficit (*BUD*) is financed. We allow either money (*M*) or bond finance (*DEBT*), so that the debt stock is related to historical deficits:

$$BUD = \Delta M + \Delta DEBT \quad (8)$$

rearranging gives:

$$DEBT = DEBT_{t-1} - BUD - \Delta M \quad (9)$$

In all policy analyses we use a tax rule to ensure that Governments remain solvent in the long run (Barrell and Sefton, 1997). This ensures that the deficit and debt stock return to sustainable levels after any shock. A debt stock target can also be implemented. The tax rate equation is of the form:

$$TAXR = f(\text{target deficit ratio} - \text{actual deficit ratio}) \quad (10)$$

If the Government budget deficit is greater than the target,(e.g. -3 % of GDP and target is -1% of GDP) then the income tax rate is increased.

External trade

International linkages come from patterns of trade, the influence of trade prices on domestic price, the impacts of exchange rates and patterns of asset holding and associated income flows. The structure of the trade block ensures overall global consistency of trade volumes by imposing that the growth of import volumes is equal to the growth of export volumes at the global level. Trade volumes and prices are linked by Armington matrices, based on 2003 trade patterns. The volumes of exports and imports of goods and services are determined by foreign or domestic demand, respectively, and by competitiveness as measured by relative prices or relative costs. The export demand variable is constructed as a weighted sum of other countries' imports, which ensures approximate balance, and any discrepancy is allocated to exports in proportion to the country's share of world trade. Import prices depend on a weighted average of global export prices, and this ensures that the ratio of the value of exports to the value of imports remains at around its historical level. It is assumed that exporters compete against others who export to the same market as well as domestic producers via relative prices. Imports depend upon import prices relative to domestic prices and on domestic total final expenditure. The overall current balance depends upon the trade balance and net property income from abroad, which comprises flows of income onto gross foreign assets and outgoings on gross foreign liabilities. World

flows of property income balance because all assets are matched by liabilities, revaluations of liabilities match those of assets and income flows match payments.

Further details on the NiGEM model are available on <http://nimodel.niesr.ac.uk/advert/niesr2nigem.php>. Enquiries about NiGEM should be addressed to Ian Hurst: aihurst@niesr.ac.uk

9. Appendix C: Assessment of Brücker (2007) model¹⁷

At the onset of the project we agreed to assess the Brücker (2007) model developed for the European Integration Consortium (2009) project, to determine if it would be appropriate to adopt in this study. The final preferred model developed for this project can be represented as:

$$\begin{aligned} \ln(mst_{it}) = & 0.96 \ln(mst_{i,t-1}) + 0.003 \ln\left(\frac{y_{eu,t-1}}{y_{i,t-1}}\right) + 0.011 \ln(e_{eu,t-1}) - 0.005 \ln(e_{i,t-1}) \\ & + 0.001 TRANS_{it} \times \ln\left(\frac{y_{eu,t-1}}{y_{i,t-1}}\right) + 0.082 TRANS_{it} \times \ln(e_{eu,t-1}) - 0.016 TRANS_{it} \times \ln(e_{i,t-1}) \\ & - 0.004 GUEST_{it} \times \ln\left(\frac{y_{eu,t-1}}{y_{i,t-1}}\right) - 0.037 GUEST_{it} \times \ln(e_{eu,t-1}) - 0.003 GUEST_{it} \times \ln(e_{i,t-1}) \\ & - 0.003 RESTR_{it} \times \ln\left(\frac{y_{eu,t-1}}{y_{i,t-1}}\right) + 0.007 RESTR_{it} \times \ln(e_{eu,t-1}) + 0.003 RESTR_{it} \times \ln(e_{i,t-1}) \\ & + 0.002 TRANS_{it} + 0.002 GUEST_{it} + 0.001 RESTR_{it} \end{aligned}$$

where

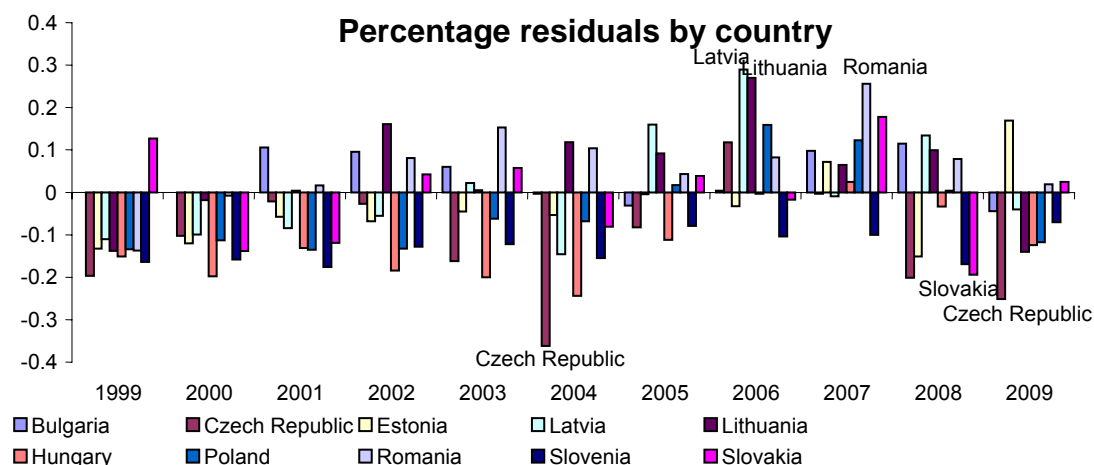
- mst_{it} : migrants from country i residing in the EU-15 as a share the population in country i, in period t
- $y_{eu,t-1}$: GDP per capita (at current exchange rates) in the EU-15 in year t-1 (source: World Bank)
- $y_{i,t-1}$: GDP per capita (at current exchange rates) in the source country in year t-1 (source: World Bank)
- $e_{eu,t-1}$: employment rate (= 1-unemployment rate; ILO norm) in the EU-15 in year t-1 (source: Eurostat)
- $e_{i,t-1}$: employment rate (= 1-unemployment rate; ILO norm) in the source country in year t-1 (source: Eurostat)
- TRANS – is a dummy variable which has a value of 1 if the transitional arrangements for the free movement of workers between the EU-15 and the EU-8 are in place and of zero otherwise.

¹⁷ Any comments or queries related to section 4.4 of the report can be addressed to Dawn Holland (d.holland@niesr.ac.uk).

- GUEST – is a dummy variable which has a values of 1 if migration from Bulgaria and Romania is facilitated by bilateral guestworker agreements and of zero otherwise.
- RESTR – is a dummy variable which has a value of 1 if the country does not participate in the free movement of the EU and the EEA and if immigration is not facilitated either by transitional arrangements for the free movement or by guestworker agreements.

We first calibrated the explanatory power of this model using an updated database, including data up to and including 2009. Figure 10.1 illustrates the residuals, or error, on the equation in each time period for each country in our study. While there are a few outliers in a few periods, the residual path is largely stable across countries and time.

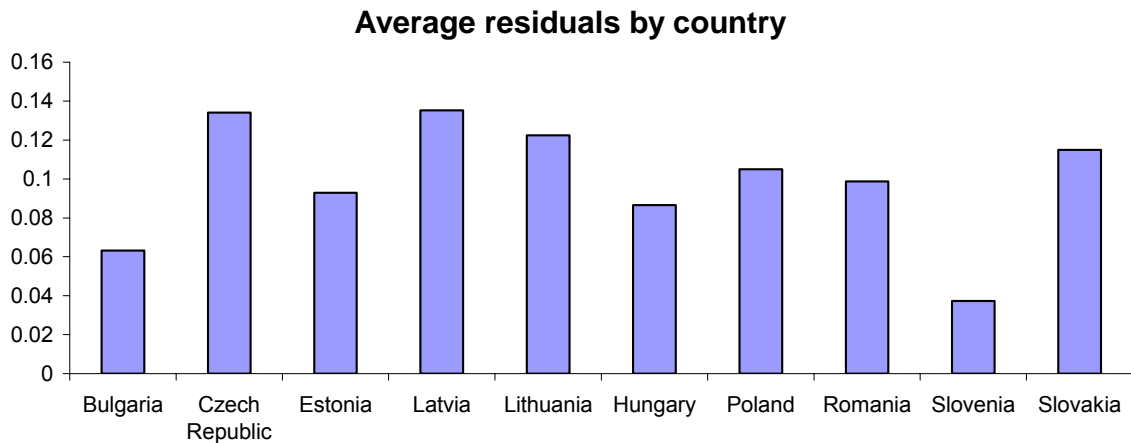
Figure C9.1. Residuals – Per cent



Source: Own calculations, based on Brücker (2007) model, table 3.2 and Eurostat data

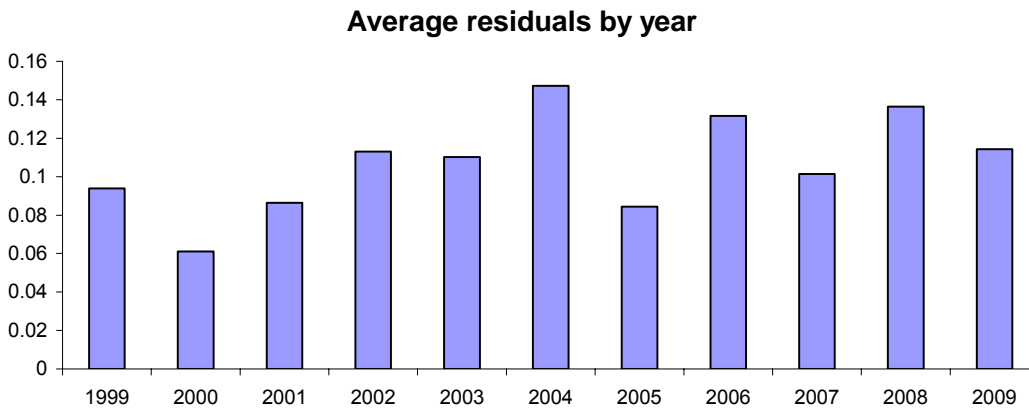
In order to illustrate this more clearly, we group the residuals above into the average residuals in each country over the sample period of 1999-2009, and the average residual in each time period over the cross section of 10 countries. These are illustrated below. These figures show that there is no particular bias against Bulgaria and Romania in this model, as the explanatory power of the model for these two countries is at least as strong as it is for the other 8 countries in the sample. There is also no clear evidence of a break-down in the model in response to the global financial crisis, with the average residuals in 2008 and 2009 not noticeably larger than in other years.

Figure C9.2. Residuals – Averages, country



Source: Own calculations, based on Brücker (2007) model, table 3.2 and Eurostat data

Figure C9.3. Residuals – Averages, year



Source: Own calculations, based on Brücker (2007) model, table 3.2 and Eurostat data

The downside of the model is that it can only provide estimates of aggregate flows to the EU-15, where we need to establish scenario variants for each of the individual destination countries.

As a next step, we constructed three scenarios using the model detailed above.

1. Base case (accession with transitional arrangements)
 - $RESTR = 0$ from 2004, $TRANS = 1$ from 2004 (from 2007 in Romania and Bulgaria), $GUEST = 1$ 2004-2007 in RM and BL otherwise 0
2. No Accession or guest workers
 - $RESTR=1$, $GUEST=TRANS=0$
3. Accession without transitional arrangements
 - Same as Base case, but $TRANS=0$

From this we should be able to calibrate the impact of EU accession on migration as the difference between scenario 1 and 2, while the impact of the transitional arrangements can be calibrated as the difference between scenarios 1 and 3. The results of this assessment are reported in the tables below.

Table C9.1. Impact of accession/guest worker

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|----------------|-------|-------|--------|--------|--------|--------|
| Bulgaria | 4373 | 5001 | 5536 | -3417 | -4445 | -5939 |
| Czech Republic | -1660 | -1426 | -1573 | -2056 | -2376 | -2376 |
| Estonia | -550 | -589 | -673 | -764 | -923 | -887 |
| Latvia | -413 | -422 | -591 | -977 | -1140 | -1471 |
| Lithuania | -919 | -1174 | -1487 | -2237 | -2661 | -3211 |
| Hungary | -1780 | -1667 | -1725 | -1900 | -2190 | -2392 |
| Poland | -8611 | -9175 | -11122 | -14917 | -19776 | -23671 |
| Romania | 13589 | 17460 | 20954 | -15287 | -22420 | -26496 |
| Slovenia | -783 | -794 | -834 | -841 | -863 | -858 |
| Slovakia | -1190 | -1258 | -1514 | -1722 | -2422 | -2413 |

Source: Own calculations, based on Brücker (2007) model, table 3.2 and Eurostat data

Table C9.2. Impact of transitional arrangements

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|----------------|--------|--------|--------|--------|--------|--------|
| Bulgaria | 0 | 0 | 0 | -6404 | -7901 | -9924 |
| Czech Republic | -2264 | -1944 | -2112 | -2737 | -3140 | -3058 |
| Estonia | -788 | -836 | -934 | -1020 | -1207 | -1157 |
| Latvia | -647 | -653 | -890 | -1412 | -1566 | -1989 |
| Lithuania | -1415 | -1798 | -2221 | -3289 | -3809 | -4524 |
| Hungary | -2605 | -2422 | -2505 | -2810 | -3231 | -3524 |
| Poland | -14700 | -15672 | -18206 | -24049 | -30713 | -34913 |
| Romania | 0 | 0 | 0 | -26339 | -37307 | -43073 |
| Slovenia | -996 | -997 | -1044 | -1051 | -1068 | -1046 |
| Slovakia | -1837 | -1930 | -2286 | -2537 | -3448 | -3301 |

Source: Own calculations, based on Brücker (2007) model, table 3.2 and Eurostat data

The results of this analysis suggest the accession to the EU actually reduced migration flows from the EU-8 and EU-2 to the EU-15, a very counter-intuitive result. It indicates that the guest worker programmes for Bulgaria and Romania increased flows to the EU-15 and that the transitional restrictions reduced potential migration, both of which are in line with our expectations. However, as a result of the counter-intuitive results for the impact of EU accession, we have decided to adopt an

alternative approach in our study. The limited time frame and budget for this study does not allow us to develop our own model to estimate the emigration rates, and we opt for a simple intuitive approach, commonly used in previous studies, that bases expected emigration rates on those observed in recent history.